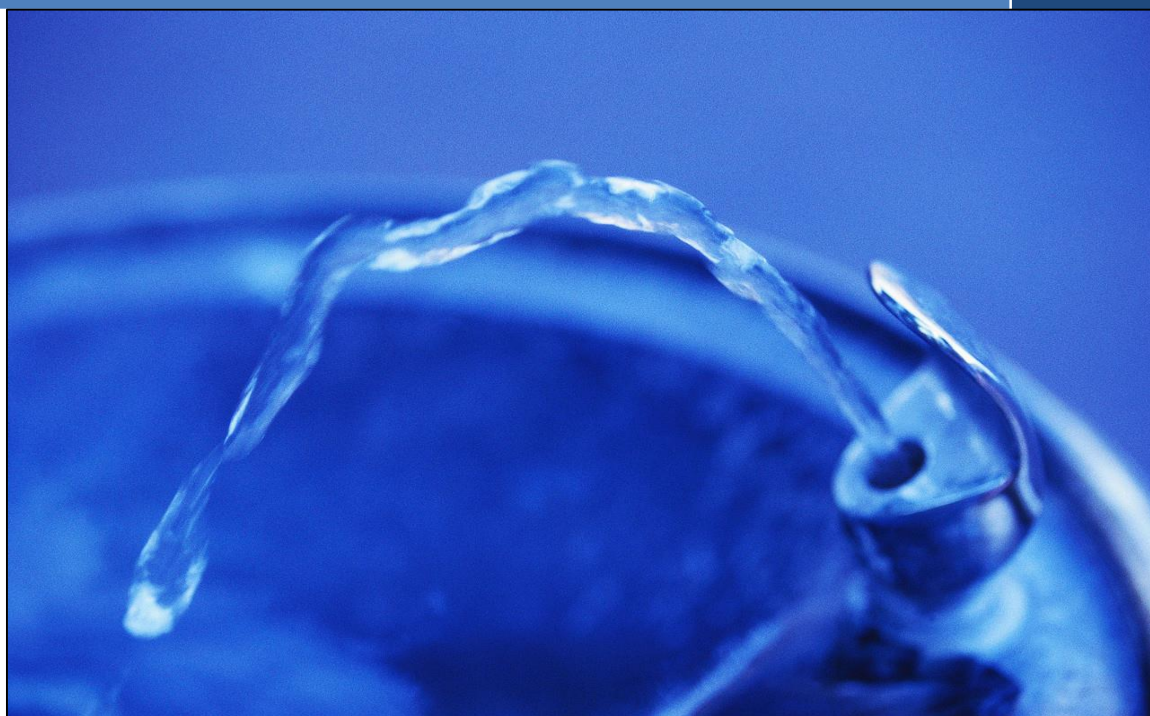
National Drinking Water Advisory Council Meeting Summary, November 6 - 7, 2014



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Attendees

National Drinking Water Advisory Council (NDWAC) Members
William Alley, Ph.D., National Ground Water Association, Ohio
Jeanne-Marie Bruno, Park Water Company, California
Marilyn Christian, Harris County Public Health and Environment Services, Texas
Mayor Hilliard Hampton, II, Inkster, Michigan
Jill Jonas, Chair of NDWAC, Department of Natural Resources, Wisconsin
Carrie M. Lewis, Milwaukee Water Works, Wisconsin
Caryn Mandelbaum, Esq., Environment Now, California
James McCauley, Lower Brule Rural Water System, South Dakota
Wilmer Melton, III, City of Kannapolis, North Carolina
Randy A. Moore, Iowa American Water
Howard Neukrug, City of Philadelphia, Pennsylvania
Sarah Pillsbury, P.G., New Hampshire Department of Environmental Services
Robert (Bob) G. Vincent, Florida Department of Health
Chris J. Wiant, Caring for Colorado Foundation
Mae Wu, Esq., Natural Resources Defense Council, Washington D.C.

Centers for Disease Control and Prevention (CDC) Liaison
Max Zarate-Bermudez, MS MPH, Ph.D., Epidemiologist, Division of Emergency and Environmental Health Services, National Center for Environmental Health, CDC, Atlanta, Georgia

Chartered Science Advisory Board (SAB) Liaison
Kimberly Jones, Ph.D., Professor and Chair, Department of Civil and Environmental Engineering, Howard University, Washington D.C.

U.S. Environmental Protection Agency (EPA) Attendees
Ryan Albert, OGWDA
Ron Bergman, Acting Director, DW Protection Division, OGWDW
Eric Burneson, Director, Standards and Risk Reduction Division, OGWDW
Rachel Carlson, OGWDW
Tom Carpenter, SAB
Lisa Christ, Chief of Targeting and Analysis Branch, Standards and Risk Reduction Division
Joyce Chandler, Office of Enforcement and Compliance Assurance
Lesley D'Anglada, Microbiologist, Health and Ecological Division, OST/OW
Carol Demarco King., Office of Enforcement and Compliance Assurance
Mindy Eisenberg, U.S. EPA, OGWDW
Michael Finn, Drinking Water Protection Division, OGWDW
Peter Grevatt, OD, U.S. EPA OGWDW
Hannah Holsinger, OW/OGWDW, SRD
Ken Kopocis, Deputy Assistant Administrator for Water

Amanda Palleschi
Ken Rotert, Standards and Risk Management Division, OGWDW
Michelle Schutz, Senior Advisor on Reuse, OGWDW
David Travers, Director, Water Security Division, OGWDW
Tom Wall, Director, Assessment and Watershed Protection Division, OWOW

Designated Federal Officer (DFO), NDWAC
Roy Simon, OW/OGWDW

Members of the Public
Public Attendees November 6, 2014
Brian Bennon, Inter-Tribal Council of Arizona
Scott Biernat, AMWA
Harold Chasa, NSF International
Faye Graul, HSIA
Hill Hapt
Cameron Harsh, Center for Food Safety
David Kay, Humane Society of U.S.
Emily Knobbe, Humane Society of U.S.
Frank Letkiewicz, Cadmus Group
Darrell Osterhoudt, ASDWA
Erin Ress, AWWA
Alan Roberson, AWWA
Lauren Schapker, NGWA
Robert Stewart, RCAP
Jim Taft, ASDWA
Jacqueline Tiaga, Humane Society of U.S.
Steve Via, AWWA

Public Attendees November 7, 2014
Brian Bennon, Inter-Tribal Council of Arizona
Scott Biernat, AMWA
Harold Chase, NSF International
Cameron Harsh, CFS
David Kay, Humane Society of U.S.
Emily Knobbe, Humane Society of U.S.
Frank Letkiewiz, Cadmus Group
Dierdre Mason, OGWDW
Erin Ress, AWWA
Lauren Schapker, NGWA
Jacqueline Tiaga, Humane Society of U.S.
Steve Via, AWWA

Meeting Summary: November 6, 2014

WELCOME AND REVIEW AGENDA

Jill Jonas, NDWAC Chair; and Peter Grevatt, Office Director, EPA Office of Ground Water and Drinking Water (OGWDW)

Jill Jonas: Ms. Jonas introduced herself as the Chair from the State of Wisconsin. She opened by thanking everyone for coming, specifically all the members of the Council and EPA Office of Ground Water and Drinking Water. Additionally, Ms. Jonas thanked the non-federal members of the public. She noted that she is glad to see her colleagues here that met back in December of last year, and she was happy to welcome the new members.

- Sarah Pillsbury from the State of New Hampshire
- Carrie Lewis from Milwaukee Water Works, Wisconsin
- Wilmer Melton from the City of Kannapolis, North Carolina
- Randy Moore from Iowa American Water
- William Alley, who goes by Bill, from the National Ground Water Association in Ohio

Ms. Jonas also thanked Council Members Marilyn Christian and Chris Wiant for attending three meetings in relation to the lead and copper working group. She stated that those issues are very complex. She added that in order to know who is participating in today's meeting, she would like to go around the room and have everyone introduce themselves at the table, and then have the people sitting along the outside of the room to introduce themselves, and then if we have anybody on the phone.

Peter Grevatt: Dr. Grevatt welcomed everyone and noted he is the Director of EPA Office of Ground Water and Drinking Water. Dr. Grevatt commented that he was delighted to be here and will be here for the duration of the two days.

(Introductions around the room.)

Jill Jonas: Ms. Jonas added that Dr. Kim Jones will be joining us later, and she is a NDWAC liaison.

Ms. Jonas continued by reviewing the agenda and asked if there were any questions before the meeting started. She added that if there were any logistical questions, Mr. Roy Simon can assist. Ms. Jonas then turned it over to Dr. Grevatt.

NATIONAL DRINKING WATER PROGRAM UPDATE

Peter Grevatt, Office Director, EPA Office of Ground Water and Drinking Water (OGWDW)

Peter Grevatt: Dr. Grevatt thanked Ms. Jonas and noted that he appreciated Ms. Jonas being there and serving as the Chair. Dr. Grevatt noted that he hopes everyone appreciates the work they do and recognizes how important it is, noting that they all bring a tremendous amount of expertise and are the venerable who's who on present drinking water issues.

Dr. Grevatt stated that they were very fortunate that Mr. Kopocis (EPA, Deputy Assistant Administrator) will be stopping by and will have some perspectives on how NDWAC's work fits in across the Office of Water and the Agency. He stated that everyone had a copy of the NDWAC Charter, and asked everyone to reference the objectives and scope of activities, and commented that this is what the NDWAC is intended to do - provide practical advice and guidance. He continued by explaining that it was consequently very important that each one of the NDWAC members participate in discussions over the next day and a half. He stated that they need the members to raise awareness of developing and emerging issues, and advise on regulations and guidance; in particular referencing an update on lead and copper. Dr. Grevatt noted that there is a Working Group on Lead and Copper and that two NDWAC members have been intensely working on this issue, Chris and Marilyn.

Circling back to the objectives, Dr. Grevatt explained that the NDWAC will provide advice, information and recommendations on matters related to activities, functions, policies and regulations of EPA under the Safe Drinking Water Act, including:

1. Providing practical and independent advice on matters and policies related to drinking water quality and public health protection.
2. Maintaining an awareness of developing issues and problems in the drinking water arena and advising EPA on emerging issues.
3. Advising on regulations and guidance as required by the Safe Drinking Water Act.
4. Recommending policies with respect to the promulgation of drinking water standards.
5. Recommending special studies and research.
6. Assisting in identifying emerging environmental or health problems related to potentially hazardous constituents in drinking water.
7. Proposing actions to encourage cooperation and communication between EPA and other governmental agencies, interest groups, the general public, and technical associations and organizations on drinking water quality.

Dr. Grevatt commented that the work the NDWAC was doing has a very important impact on how EPA proceeds on these critical issues.

Next, Dr. Grevatt explained that Ms. Michelle Schutz was going to be taking over as the NDWAC Designated Federal Officer, noting that she is very experienced in Office of Water. He then stated that he greatly appreciated Mr. Simon for everything he has done for the Council. He commented that in the time he has been with EPA, NDWAC has really stepped up and that is in large part thanks to Mr. Simon and everything he has done.

Dr. Grevatt noted that he would like to take some time to reflect on the big issues they are going to be talking about throughout the duration of the meeting. He explained that looking back, it is important to think about the role, and importance of, a billion glasses of tap water every day! plays in the Nation, and how, before the Safe Drinking Water Act (SDWA), they did not have the level of funding/investment, regulations, science or technology for drinking water. He stated that in 1962, twenty-eight substances were regulated by the U.S. Government, and forty percent of systems did not meet those standards and over fifty percent of facilities had issues with disinfectants, etc. so they have come a really long way. He explained that as a result of the SDWA, so much has been accomplished:

- There are fifty thousand community drinking water systems around the Nation, which poses a challenge in regards to how to make sure everyone has the resources to continue delivering safe drinking water.
- Residential customers pay on average $2.89 per thousand gallons of water for drinking water. This presents challenges in terms of resources that are available.
- Since 1997, the EPA Drinking Water State Revolving Loan Fund has funded over twenty-five billion dollars in projects.

Dr. Grevatt then stated that it was a banner year for challenges in drinking water considering what happened in Charleston, West Virginia in January and Toledo, Ohio in August. Two very different events with the same outcome, people couldn't use their water. He explained that in Toledo they couldn't even drink the water after it had been boiled. In West Virginia, the estimated cost was seventy-two million dollars over five days, and their problem was one that continued for days and weeks as a result of the leak. The compound which was released into the water had a very low odor threshold, so long after the drinking water was meeting proper levels prescribed by the Center for Disease Control and Prevention (CDC), people could still smell and taste it in the water. On the 40th anniversary of the SDWA, our water source challenges continue. Dr. Grevatt noted that all of this work is non-regulatory in nature; it's not mandatory, which is a challenge. He then commented that they were going to talk about some regulations and give the Council a regulatory update, and that Mr. Burneson was going to give a detailed summary of the third regulatory determination of the SDWA; noting this was the first preliminary positive regulatory determination that has been done under the Act. Dr. Grevatt explained that this is an early step in the regulatory process and what follows is a public comment period which will be open for a little over a month. Then the Administrator has to make a determination, followed by a public comment period, proposed rule, another public comment period and then a final rule. He then reiterated that this was an important milestone for EPA in that the only other one was perchlorate.

Dr. Grevatt introduced Ken Kopocis, and said Mr. Kopocis brings a wealth of experience and we are very fortunate to have him.

Ken Kopocis: Mr. Kopocis thanked everyone for being there. He commented that he can't overstate the value of NDWAC. Their efforts to travel to the meeting and advise EPA are greatly appreciated. Mr. Kopocis added that he knows there will be many great discussions throughout the meeting.

Mr. Kopocis explained that most of his life was spent on Capitol Hill and most of his travel was during his time as a Hill employee. He commented that he has been to 28 countries around the world, and in those 28 countries, there were only two countries that didn't advise him against drinking the water. He added that one was Canada and the other was the United States. He explained that his travel was not to third world countries either.

Mr. Kopocis stated that EPA is looking forward to celebrating the anniversary of the Safe Drinking Water Act, and that he talked about the Administrator's priorities. He stated that obviously protecting water is a priority along with climate change. He posted a rhetorical question: will it climate change be felt first in the water sector? Mr. Kopocis went on to state that another priority is making a difference in communities. He added that it has been questioned the value of what it is we do, and he added that he was talking about the value we provide to people and communities. He stated that EPA needs to make sure that people understand that what we provide is a service to the public and that it is a service that the public wants. EPA provides desired service to the public. Mr. Kopocis reiterated that we need to make sure people understand that. He also added that he thinks there are opportunities to do things in new ways.

He commented that the Safe Drinking Water Act is forty years old and the Clean Water Act is celebrating its 42nd anniversary. He explained that we still have to move water around and have to deal with new emerging issues that we face, for example, new contaminants and recognizing the intersection between the Clean Water Program and the Safe Drinking Water Program.

Mr. Kopocis noted that EPA is looking at making better use of natural systems and looking for local solutions. He added that another central element priority in the Office of Water is the proposed rule on what constitutes jurisdiction of the Clean Water Act. He explained that there was a rule out for public comment and the agencies are anticipating doing a final rule next year. No one questions the federal obligation to participate in protecting water.

Mr. Kopocis explained that the Potomac River is a body of water that needs to be protected and they have to be cautious about drinking water. He added that this goes for most bodies of water. He commented that a third of Americans depend on drinking water from sixty percent of streams that do not flow year round.

He noted that too often EPA has been criticized and he thinks we all know that one of the first things a business looks at is what is the availability of water and that is because they can't operate without it. He noted that water is also important for businesses. He further noted that while on Capitol Hill for several years, it was there that he learned how the electronics industry looks at drinking water because they have to run various parts of their technology through some water filters for various sensitive manufacturing processes before they could use it. This is an example of how much the American industry and our economy rely on clean and safe water.

He concluded by stating that he thinks protecting water for drinking will have a direct benefit for the people and elements of the economy by improving the use of water in the natural system - and in turn, ensuring we have a safe drinking water supply. Mr. Kopocis thanked everyone again.

Peter Grevatt: Dr. Grevatt asked if there were any questions for Mr. Kopocis.

Ken Kopocis: Mr. Kopocis thanked everyone.

Peter Grevatt: Dr. Grevatt pick up where he left off and noted he had a few more words before they began the Regulatory Update by Mr. Burneson. He stated that Mr. Kopocis talked about the 40th anniversary of the SDWA, and some of the accomplishments and challenges going forward. Dr. Grevatt then noted that these challenges are important for everyone to think about. He explained that on a regular basis they do drinking water needs surveys and the last one estimated a need for three-hundred and eighty-four billion dollars over the next twenty years, which provides perspective regarding the magnitude of the situation. He commented that a lot of the need has to do with system pipes, and if you take that pipe and make one long line of pipe around the globe - six times around the globe accounts for the estimated amount of pipe needed over next twenty years. Dr. Grevatt stated there are two hundred thousand water main breaks every year and just meeting that challenge of replacing what you have is cumbersome let alone what is needed for the future. Consequently, he noted that they need to think about what they need to be resilient to face the challenges of the future. For example, in regards to source water quality in the context of events like the one in Charleston and the issues of drought and water quality in California and Texas. The less and less water a community has to work with, the harder it will be to remove things from it: 2013 was the driest year in California and 2012 was the worst year for drought in Texas.

Dr. Grevatt explained that another extraordinary challenge is water reuse, a growing arena they need to be thinking about. He noted that they do quite a bit in his office with the climate mitigation and adaptation program. He explained that early this year, they completed the first carbon sequestration process which is important for climate mitigation and trying to address greenhouse gases. In regards to climate adaptation, Dr. Grevatt explained that one tool they have been developing is the CREATE tool to help local communities with identifying what challenges they should be prepared to address. He then stated that they also just released a flood resiliency guide and noted that climate adaptation is not just a drinking water sector issue, waste water is equally impacted in that the waste water treatment plants directly affect waterways. Next, Dr. Grevatt noted that they are working with National Oceanic and Atmospheric Administration (NOAA) on storm surge mapping and tools. Understanding that with sea level rise, some of the old flood maps might not represent the best available information going forward. He closed by stating there is a small technical assistance grant in process right now worth 12.7 million dollars and that the application closes in December; noting that EPA sees this as a very important part of the work they do. Dr. Grevatt then asked if there were any questions.

Howard Neukrug: Mr. Neukrug asked what CREAT stood for.

Peter Grevatt: Dr. Grevatt replied that CREAT stands for Climate Resilience Evaluation and Awareness Tool.

Mae Wu: Ms. Wu asked if Dr. Grevatt could clarify what he meant when saying perchlorate is the first preliminary positive regulatory determination.

Peter Grevatt: Dr. Grevatt replied by saying technically safe drinking water includes the development of the CCL list and the unregulated contaminant monitoring rule. He added that strontium has moved through this process and what happened with perchlorate was that it had a negative determination, in turn reversing that decision.

Mae Wu: Ms. Wu said thank you.

Jill Jonas: Ms. Jonas mentioned that she appreciated the comments Dr. Grevatt made on quality and quantity, and what is regulatory and what isn't. She asked Dr. Grevatt to speak on that issue in regards to flooding or droughts as the population continues to grow and how that might evolve in the future in conjunction with climate change.

Peter Grevatt: Dr. Grevatt responded by saying it involves a number of moving parts and there is an overwhelming population growth and it's steadily increasing. Dr. Grevatt noted that it presents challenges. He added that there are also efforts that he didn't talk about, like water conservation (low-flow toilets etc.) currently working to combat these challenges. He explained that many drinking water utilities have a volume-based pricing structure and there are consequently challenges around infrastructure investments when they are bringing in less water/profit as a result of less water delivery. He added that they are not going to get involved with issues regarding the price of water, but they recognize that when drinking water systems have less water available that will lead to a need for new technologies and processes for how communities utilize their water supply.

Jill Jonas: Ms. Jonas thanked Dr. Grevatt.

Howard Neukrug: Mr. Neukrug commented that he would like to build on what Ms. Jonas said and talk just a little more about quantity. He explained that when he is asked what he considers to be the biggest issue, it's always quantity and the impact it has on buildings, safety and erosions in the systems. He noted that he recognizes it's a tough spot for EPA to deal with the quantity issue, but wonders if there is another way to start tackling this issue.

Chris Wiant: Mr. Wiant mentioned that it's really about source water protection. He added that it all comes back to treatment and he is interested in EPA's thoughts on where they are on source water.

Peter Grevatt: Dr. Grevatt replied that source water protection is important and challenging; however, the Safe Drinking Water Act does not mandate source water protection. Dr. Grevatt explained that mandate was checked off in 2003, but it's all voluntary-even in the case of Charleston, West Virginia. He added that he doesn't hear a whole lot of people talking about Charleston anymore, although the people in Charleston are still dealing with aftermath. Dr. Grevatt commented that there is a need to bring partners together and therein lies part of the challenge. He ended by saying it's cheaper to deal with a problem at the source.

DRINKING WATER REGULATORY DEVELOPMENT ACTIVITIES

Eric Burneson, Director, Standards and Risk Management Division, OGWDW

Eric Burneson: Mr. Burneson stated that it is a pleasure to be able to talk to the Council about this topic. He noted that in this presentation he will talk about the Contaminant Candidate List, Regulatory Determinations, Unregulated Contaminant Monitoring, Rules undedevelopment/revision, and Six-Year Review of regulations. . He also stated that at each stage of the regulatory process there is a need for increased specificity and confidence in the type of supporting data used (e.g. health, occurrence, and treatment).

Mr. Burneson started by explaining the Contaminant Candidate List (CCL). He noted that they published the third Contaminant Candidate List (CCL 3) in October 2009, which listed 116 contaminants:

- 12 microbes (e.g., viruses, bacteria)

- 104 chemicals (pesticides, industrial chemicals, pharmaceuticals, inorganics)

He commented that in the spring of 2012, they published a Federal Register notice requesting nominations of contaminants to be considered for inclusion in CCL 4, which contained:

- 59 unique contaminants were nominated by 10 organizations and individuals
- 5 microbes and 54 chemicals
- 8 contaminants were nominated more than once

Mr. Burneson explained that the nomination letters and web site submittals can be found in the CCL 4 docket (EPA-HQ-OW-2012-0217) at www.regulations.gov and we can expect the Draft CCL 4 publication in 2014.

Mr. Burneson continued by discussing Regulatory Determination and said the SDWA requires EPA to make regulatory determinations for at least 5 CCL contaminants every five years. EPA must regulate if:

1. The contaminant is known to occur or there is substantial likelihood that the contaminant will occur in public water systems with a frequency and at levels of public health concern;
2. The contaminant may have an adverse effect on the health of persons; and
3. In the sole judgment of the Administrator, regulation of such contaminant presents a meaningful opportunity for health risk reduction for persons served by public water systems.

He noted that for the Regulatory Determination Outcome there is:

1. No Regulatory Determination which includes insufficient data to assess contaminant on three criteria.
2. Positive Determination which includes affirmative determination for all three criteria, begin process to develop a drinking water regulation, and not considered a final agency action, and;
3. Negative Determination which includes negative determination for any one of the three criteria, considered a final agency action, drinking water regulation is not developed and health Advisory is a non-regulatory option.

Mr. Burneson continued with the Regulatory Determination for strontium. He mentioned strontium primarily comes from naturally occurring inorganic compounds that are widely present in soils, and is also used in fertilizers and pyrotechnics. He continued by saying it has adverse effects which include decreased bone calcification which could lead to fractures and osteoporosis. He stated that EPA derived a Health Reference Level (HRL) of 1500 ug/L for strontium based upon these health effects and children's exposure factors. Mr. Burneson commented that it is known or likely to occur and is found in 7% of 989 water systems greater than HRL. He also said it had meaningful opportunity for health risk reduction and that 11% of the population exposed for systems with detects greater than HRL in the ground water survey. Mr. Burneson stated that they are currently collecting surface and ground water occurrence data as part of Unregulated Contaminant Monitoring Rule 3 ((UCMR 3) (2013-2015)). The first eighteen months of data (half) will be available for making the final determination. All of the UCMR 3 data will be available for the proposed and final rule makings.

Mr. Burneson continued with the regulatory determination for 1,3-Dinitrobenzene, Dimethoate, Terbufos & Terbufos Sulfone. He said that all of them have adverse effects; however, none of them are likely to occur or have a meaningful opportunity health risk reduction.

Mr. Burneson explained the status and next steps for Regulatory Determinations 3 (RD3). He stated the next steps are as follows:

- Preliminary RD3 Federal Register Notice - published October 20, 2014.
    - Sixty-day public comment period.
- Hold stakeholder meeting and solicit public input during the sixty-day comment period.
- Publish final regulatory determination ~December 2015.
- If the agency makes a final determination to regulate strontium, then:
    - Proposed regulation twenty-four months after final regulatory determination notice.
    - Promulgate final regulation eighteen months after proposal.

Mr. Burneson continued with UCMR 3 by noting that the final rule was published May 2, 2012 and that monitoring is taking place January 2013 – December 2015; reporting through approximately mid-2016. He added that twenty-eight chemicals and two viruses are on the UCMR 3 and chemical contaminants include hormones, per fluorinated compounds (e.g., FOS/PFOA), VOCs, metals (including Cr-6 and total Cr), 1,4-dioxane and chlorate.

Mr. Burneson discussed that they have some UCMR 3 preliminary results and they are posted quarterly to: http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/data.cfm. He noted that currently reflects reported data as of July 1, 2014 and that November 2014 update will reflect data as of October 1, 2014. Mr. Burneson explained that UCMR 3 Minimum Reporting Levels (MRLs) are based on an analytical method quantitation limits.

Mr. Burneson explained that the UCMR 4 is under regulatory development for the next cycle of monitoring. He noted that a public meeting/webinar was held May 2014 to discuss potential UCMR 4 contaminants and they anticipate publishing proposed rule mid-2015 and inviting public comment. He stated he anticipates publishing the final rule late 2016 and implementation preparation by EPA, States, PWSs and labs would take place through 2017. He added that they anticipate starting monitoring January 2018.

Mr. Burneson discussed other rules under development which include perchlorate. He commented that EPA as part of the agencies efforts to develop a proposed perchlorate standard, EPA will:

- Continue to evaluate available data on perchlorate occurrence.
- Evaluating the feasibility of treatment technologies to remove perchlorate and examine the costs and benefits of potential standards.

However, Mr. Burneson stated that EPA's current efforts are focused on addressing the Science Advisory Board Recommendations for methodologies to derive a Maximum Contaminant Level Goal (MCLG) May 29, 2013. SAB recommended developing a perchlorate MCLG using

Physiologically Based Pharmacokinetic (or "PBPK") modeling rather than the traditional approach of using the reference dose and exposure factors. He added that EPA is working with FDA scientists to evaluate options for PBPK modeling to derive a perchlorate MCLG.

Mr. Burneson also explained that another rule under development is the Carcinogenic VOCs Group. He explained that EPA is developing a proposed group cVOC standard and they are considering regulated (TCE, PCE and others) and unregulated carcinogenic VOCs (cVOCs). He stated EPA needs to assess potential cVOCs for the group based upon similar health effect endpoints; common analytical method(s); common treatment or control processes; and occurrence/co-occurrence in drinking water. Occurrence data is being collected for 3 unregulated cVOCs currently under UCMR 3. Mr. Burneson noted that EPA would be consulting today with the NDWAC on options for group MCLs.

Mr. Burneson continued his presentation on the Six-Year Review. He explained that EPA must review and, if appropriate, revise existing NPDWR every six years. He commented that in 2003, EPA completed the first Six-Year Review of sixty-nine NPDWRs and made the decision to revise the 1989 Total Coliform Rule. In 2010, EPA completed the second Six Year Review of seventy-one NPDWRs and identified tetrachloroethylene (PCE), trichloroethylene (TCE), acrylamide and epichlorohydrin as candidates for revision. Mr. Burneson said they expect to complete the third Six-Year Review by 2016. He noted that forty-six states and eight primacy agencies have supplied EPA with their compliance monitoring data for this review. He added that they are continuing our review of the data and are working directly with the states and primacy agencies to resolve any data questions.

Mr. Burneson stated that the key elements to the Six-Year Review protocol are:

- Identifying rules with revisions underway or recently promulgated,
- health effects evaluation,
- MCLs and treatment techniques,
- analytical methods, treatment evaluation,
- occurrence analysis and
- implementation issues.

Mr. Burneson said that this is the first time EPA is reviewing the entire suite of Microbial and Disinfection Byproducts (MDBP) Rules and that chemical and radiological rules also are currently undergoing review. He noted that they plan to retain the same key elements as were used for SYR1 and SYR2 that include minor clarifications are being made to the protocol where necessary to better reflect the third Six-Year Review (SYR3) review process for MDBP Rules.

Mr. Burneson informed everyone that the MDBP Rules that are undergoing Six-Year Review include:

- The Surface Water Treatment Rules (SWTR, IESWTR, LT1, LT2), which addresses microbial contaminants in SW systems, includes NPDWRs for Giardia, Viruses, Legionella, Coliforms, Cryptosporidium, Heterotrophic Plate Count and Turbidity. He added that the Ground Water Rule, which addresses microbial contaminants in GW systems, includes NPDWR for Viruses.

- The Disinfectants/Disinfection Byproducts Rules, which addresses disinfectants and disinfection byproducts, includes NPDWRs for TTHM, HAA5, Bromate, Chlorite and Disinfectants (Chlorine, Chloramine, and Chlorine Dioxide).
- He said that in addition to those, there is the Filter Backwash Recycling Rule.

Mr. Burneson further explained the review of Long Term 2 Enhanced Surface Water Treatment (LT2) Rule. He stated that in 2011 EPA announced plans to initiate the review of LT2 in response to executive Order 13563 (Improving Regulation and Regulatory Review). He noted that they have held three stakeholder meetings to solicit/gather information on the Round 1 monitoring results/bin placement, analytical methods improvements, uncovered finished reservoirs, and microbial toolbox options.

Mr. Burneson noted that EPA has recently sought stakeholder input on storage facility inspection and cleaning. Mr. Burneson noted that in the 2010 proposed revisions to the Total Coliform Rule, EPA requested comment on "the value and cost of periodic storage facility inspection and cleaning." He said that many commenters suggested cleaning and inspection requirements citing outbreaks (i.e. Alamosa, CO 2008) and conditions found in some tanks, and other commenters stated that sanitary survey requirements are adequate and information collection should continue. He explained that on October 15, 2014, EPA held a public meeting and webinar to gather more information and exchange ideas on how best to assure drinking water quality is not degraded in storage facilities. Mr. Burneson stated that EPA had not made any decision on what actions to take regarding storage facility inspection and cleaning.

Following Mr. Burneson, Mr. Wiant and Ms. Christian gave an update on the Lead and Copper Rule Working Group.

Chris Wiant: Mr. Wiant gave a sense of the complexity of the lead and copper rule issues. He noted that the thing that is important is the process and the people involved are a really excellent group and have been put together to deliberate on this topic.

Mr. Wiant explained that EPA's goal for the long-term revisions is to improve the effectiveness of corrosion control treatment in reducing exposure to lead and copper, and to trigger additional actions that equitably reduce the public's exposure to lead and copper when corrosion control treatment alone is not effective. He discussed that EPA wanted to form a Working Group even though, in 2011, EPA consulted with the NDWAC on key areas of LCR rule revisions. Since 2011, EPA has further analyzed those key areas and is seeking greater, in-depth stakeholder input. Mr. Wiant added that another reason they formed the Working Group was to facilitate this input; EPA helped to form a Working Group under the auspices of the NDWAC to provide input and recommendations.

Mr. Wiant explained that Working Group members were selected based on the experience needed to provide balanced advice on the five issues related to long-term revisions to the LCR, and that members of the NDWAC have been selected for Working Group participation in order to facilitate the flow of information between the Working Group and NDWAC. Mr. Wiant noted that the Working Group composition did several things:

- Identified key stakeholder groups to provide broad perspectives.
- Stakeholder organizations identified their participant.

- Looking for balanced Working Group membership (diversity of views, experience, and geographic representation).
- Fifteen member Working Group (states, local public health, utilities, non-profits, consumer groups).

Mr. Wiant noted that the Working Group is exploring five specific technical issues and will:

- Provide suggestions on how to implement the goals for LCR revisions.
- Provide information.
- Share perspectives on advantages and disadvantages of options under consideration by EPA.
- Suggest additional options.

He stated that the Working Group will report to the NDWAC (consensus where possible, with minority reports where no consensus), which in turn will provide recommendations on these issues to EPA. Mr. Wiant explained the key issues for input and said the five key areas of the LCR for revision, which would benefit from stakeholders input, are as follows:

1. Measures to ensure optimal corrosion control treatment
2. Sample site selection criteria for lead and copper
3. Lead sampling protocol
4. Public education for copper
5. Lead Service Line Replacement (LSLR)

Mr. Wiant discussed that there are differences across the community based on different water system patterns. He added that we have to figure out how to balance those and the bottom line- what is the exposure potential. He added a question, how do you make sure you are doing the best you can to protect the general population? Mr. Wiant further commented that another huge element is public education for lead and copper, and that it is helpful that the homeowner to understand the parameters when lead exposure might be higher. Mr. Wiant reiterated that it's not a simple task.

Mr. Wiant then explained the challenges:

- What is optimal corrosion control and what water quality factors influence its effectiveness?
- The goals of site selection and sampling protocol.
    - System-wide regulatory compliance vs. risk identification and mitigation at the household/facility level.
    - How to increase the probability of identifying areas of higher risk.
    - Differences in sampling for lead vs. copper risk.
- Remedy selection.
    - Lead Service Line Replacement (LSLR).
        - Cost.
        - Feasibility.
        - Certainty of effectiveness of the remedy.
- Community education.

- Interpretation of monitoring results to inform public education efforts.
- Dissemination and effectiveness of health risk information and protection strategy messaging to consumers.

Mr. Wiant said he has been impressed with discussion, leadership and the incredible expertise. He noted that we have top notch people from EPA and from private sector who have offered good information and organization.

Marilyn Christian: Ms. Christian recommended reading the summaries on the website to gain background information. She added that when talking about lead and copper refer to: http://water.epa.gov/lawsregs/rulesregs/sdwa/lcr/lead_review.cfm.

Chris Wiant: Mr. Wiant asked if anyone had any questions.

Roy Simon: Mr. Simon noted that EPA has sent out notes from the previous meetings and joked that he knows everyone has read them from cover to cover.

Mae Wu: Ms. Wu noted she wanted to ask a clarifying question - For strontium regulatory determination you said you have a health reference level. Is that determined the same way?

Eric Burneson: Mr. Burneson replied that this is an assessment in the Office of Water that has been based on a new evaluation of health studies with a consideration of children's exposure.

Randy Moore: Mr. Moore asked what the national magnitude is and how much lead and copper is still in our system. He noted that he knows progress has been made, but was interested to know if that has been looked into.

Chris Wiant: Mr. Wiant noted that monitoring has been going on for some time and that the problem hasn't gotten worse, it is what it is.

Eric Burneson: Mr. Burneson added that in terms of the number of systems that are subject to the rule-the total is around seventy thousand community water systems and nontransient community water systems. When it comes to lead service lines, eleven to twelve million service lines were in place when the rule was first promulgated and that EPA estimates that one to two million service lines have been replaced leaving ten to eleven million remaining. He added that when it comes to the systems that are exceeding the action levels, that is actually fewer than fifty a year.

Carrie Lewis: Ms. Lewis commented that as the Work Group moves towards the remedy, she would recommend, as Mr. Burneson discussed, looking at the balancing of rules and how that might assist us to find the right path. She added that it seems that they have the issues with the lead and copper remedy in that one of the best practices for corrosion control is the addition of the phosphate compound in drinking water although the discharge of phosphates into environment is not considered a good thing.

Marilyn Christian: Ms. Christian responded that has been brought up in Working Group.

Wilmer Melton: Mr. Melton noted that he appreciated the hard work on this. Mr. Melton said his question relates to cost and efforts, and that it was mentioned as systems sample they work with customers who may not be experts of the problems on the backside of the meter and that is something every system has to deal with. He followed up by asking if they have a sense of how much of that infrastructure cost is on the customer's side of the meter.

Eric Burneson: Mr. Burneson replied by saying that the NDWAC Working Group isn't preparing a cost analysis. He noted however, that it's fair to say the cost burden is being considered by the Working Group as they make recommendations. Mr. Burneson added that EPA will develop a cost and benefit analysis for any proposed revisions to the rule and that considers the costs primarily to local water systems.

Howard Neukrug: Mr. Neukrug stated that his utility just finished its five year sampling for lead and copper and they passed with flying colors; however, he is unhappy to report that they still have some homes that were above the limit, including 1,000 lines. Mr. Neukrug added that they are spending five million dollars to replace water meters to make them lead free.

William Alley: Dr. Alley stated that strontium looks like more of a problem in groundwater than surface water.

Eric Burneson: Mr. Burneson replied that the occurrence studies seem to indicate strontium is more prevalent in groundwater than surface water. He noted however, that the occurrence in groundwater versus drinking water is not a key factor in the regulatory determination step. However, he noted that the type of system that must take action to address strontium could play a big factor in the cost benefit analysis that is part of the development of a proposed regulation in the next step of the process.

Peter Grevatt: Dr. Grevatt wrapped up the discussion by thanking Mr. Burneson, Mr. Wiant and Ms. Christian. He added that he wanted to be really clear on what happens next. Dr. Grevatt said they will provide NDWAC with some of the key issues that they will have to contend with, so Dr. Grevatt encourages everyone to carefully review the information. He explained that everyone will have the opportunity to consider what the Working Group comes up with and then they will be asked to provide a letter with recommendations to the Administrator. He thanked everyone and the session concluded.

CONSULTATION ON DRINKING WATER TREATMENT COMPLIANCE FLEXIBILITY – ISSUES RELEVANT TO THE LONG TERN 2 ENHANCED SURFACE WATER TREATMENT RULE

Eric Burneson; Ken Rotert, Standards and Risk Management Division, OGWDW; Mike Finn, Drinking Water Protection Division, OGWDW; Carol DeMarco King and Joyce Chandler, Office of Enforcement and Compliance Assurance

Eric Burneson: Mr. Burneson explained that he would speak briefly and then turn it over to his colleagues who would present. He noted that Ken Rotert would start them off.

Ken Rotert: Mr. Rotert thanked everyone and noted that as Mr. Burneson mentioned he would talk about the Long Term 2 Enhanced Surface Water Treatment Rule and would review the following:

- Congressional Language.

- Background.
- Federal Advisory Committee Involvement.
- Overview of LT2 Rule.
- Implementation.
- Microbial Toolbox.
- Training and Technical Assistance by EPA/States.
- Compliance Status.
- SDWA: Public Water System Enforcement.
- Discussion/Questions.

Mr. Rotert stated that the congressional language defined Drinking Water Treatment Compliance Flexibility. He noted that the Congress recognized that the Long Term 2 Enhanced Water Treatment Rule presents significant costs and technical challenges for systems serving fewer than 100,000 persons, while current time frames present significant challenges for communities seeking to annualize the capital investment. In addition to that, the Congress directs EPA and the States to work in partnership with municipalities that are progressing in good faith to comply with the rule and need additional time to minimize volatility in water utility rates for ratepayers. Lastly, the Congress directs EPA to convene a working group of Federal, State and local stakeholders to discuss options for compliance schedules and report to certain congressional Committees within 180 days of enactment of this Act about interim options for ensuring protection of human health and the environment under the rule - without the use of an enforcement action or an administrative order. Mr. Rotert noted that the source of this language could be found here: (http://docs.house.gov/billsthisweek/20140113/113-HR3547-JSOM-G-I.pdf)

Mr. Rotert then went into some general background on the LT2 Rule and stated that in 1989 there was the Surface Water Treatment Rule (filtration, disinfection, turbidity, Giardia lamblia, viruses, Legionella and heterotrophic bacteria). In 1992-93 there was also a regulatory negotiation process. He noted that in 1993 there was the Milwaukee outbreak, which was the most notable outbreak of cryptosporidiosis in U.S. history (403,000 ill; at least 54 died). He went on to explain that in 1996 there were the Safe Drinking Water Act (SDWA) Amendments and in 1997 Stage 1 Microbial/Disinfection Byproducts (M/DBP) Federal Advisory Committee (FAC) Agreement in Principle (AIP) was signed. He commented that in 1998 the Interim Enhanced Surface Water Treatment Rule (IESWTR) went into effect and applies to public water systems (PWSs) that use surface water or ground water under the direct influence of surface water (GWUDI) and serve ≥ 10,000 people. He noted that in 2000 the Stage 2 M/DBP FAC AIP was signed and in 2002 the Long Term 1 Enhanced Surface Water Treatment Rule (LT1) was promulgated to apply to all small PWSs (serving less than 10,000 people) that use surface water or GWUDI. He explained that later in 2006 the Long Term 2 Enhanced Surface Water Treatment Rule (LT2) went into effect that targets systems with elevated source water Cryptosporidium concentrations.

Mr. Rotert noted there is a public health concern and that Crypto is a pathogenic protozoan parasite introduced to water primarily via waterfowl and mammal feces. He stated that most human infections are caused by two of twelve Crypto species detected in humans (C. hominis and C. parvum). He then noted that Crypto can cause gastrointestinal illness (e.g., diarrhea, vomiting, and cramps) and healthy people recover within several weeks, but illness may persist and lead to death in those with compromised immune systems (e.g., AIDS patients, the elderly). Other sensitive subpopulations include young children and pregnant woman who may be more susceptible to dehydration resulting from diarrhea. He commented that the LT2 Rule estimated more than 100,000 Cryptosporidiosis cases per year were occurring subsequent to the IESWTR and LT1 requirements.

Mr. Rotert noted he would only be talking about the first four bullets on his slides. He explained the occurrence and treatment addressed by the LT2 rule. He stated that monitoring data from the 1990s found large differences in source water Crypto occurrence across different water sources, and some systems may not have been getting adequate treatment while implementing the IESWTR and LT1. He commented that Crypto is resistant to most disinfectants except for ultraviolet light disinfection (UV), with UV being especially cost effective (big help for unfiltered systems). He noted that other technologies are also available like membranes and enhanced filtration.

Mr. Rotert went on to explain about a Federal Advisory Committee (FAC) involved and the "Agreement in Principle." He stated that during the 1992-1993 regulatory negotiation process, stakeholders suggested a phased risk-risk tradeoff M/DBP strategy. He commented that the IESWTR and LT1 built upon stakeholder agreements reached in 1993, but also reflected the recommendations from the 1997 Stage 1 M/DBP FAC Agreement in Principle. Mr. Rotert explained that during 1999 – 2000, the Stage 2 M/DBP FAC developed recommendations for the Stage 2 DBP and LT2 rules. M-DBP FAC membership included EPA, States, environmental and public health advocates, drinking water utilities, and chemical and equipment manufacturers. He noted that EPA agreed to develop a proposed rulemaking that reflected the recommendations of the M/DBP FAC Agreement in Principle and EPA proposed the LT2 rule in 2003, which reflected the recommendations.

Mr. Rotert discussed the "flexibility for systems" based on the Agreement in Principle and stated that the Stage 2 M/DBP FAC recognized that systems may need to provide additional protection against Crypto, and that such decisions should be made on a system specific basis. He noted that this approach involves assignment of systems into different categories (or bins) based on Crypto source water monitoring results. Mr. Rotert said that additional treatment requirements depend on the bin to which the system is assigned, and that in terms of flexibility, the systems will choose technologies to comply with additional treatment requirements from a 'toolbox' of options.

Carrie Lewis: Ms. Lewis stated that she had two questions/comments thus far. She noted she was surprised ozone is not listed as a treatment for Cryptosporidium.

Mike Finn: Mr. Finn responded and said when looking at ozone in comparison with UV, UV is more effective; however, ozone is an option. He noted that it is much less effective.

Carrie Lewis: Ms. Lewis thanked him for that answer and then asked how the bin sizes were determined?

Ken Rotert: Mr. Rotert responded by saying he has slides explaining that and would get to it shortly.

Howard Neukrug: Mr. Neukrug commented that he was taken aback by the fact that LT2 had an estimated 100,000 cases before the Rule and wondered has there been any research since then?

Ken Rotert: Mr. Rotert responded that they don't have any info to indicate what the current levels and/or number of cases of Cryptosporidiosis disease in the U.S. are.

Howard Neukrug: Mr. Neukrug responded by saying that would be a fascinating piece of information.

Ken Rotert: Mr. Rotert continued with his presentation in regards to the Federal Advisory Committee/Agreement in Principle. He noted that additional treatment requirements assume that conventional treatment plants in compliance with the IESWTR achieve an average of 3 logs removal of Crypto. He explained that meeting the requirements for each "Action Bin" may necessitate one or more management strategies, which include watershed control, reducing influent Crypto concentrations, improved system performance and additional treatment barriers.

Mr. Rotert moved on to an overview of the LT2 rule. He explained that LT2 is a National Primary Drinking Water Regulation (NPDWR) that aims to reduce disease incidence associated with Crypto and other pathogenic microorganisms in drinking water. He stated there are several drivers for LT2 development, and those include:

- Some Crypto strains highly infectious.
- Feasible to measure Crypto concentrations in source water.
- Some systems have high source water Crypto concentrations.
- Feasible to lower Crypto source concentrations.

Mr. Rotert commented that the targeted approach supplements existing regulations (e.g., SWTR) to address Crypto in systems with higher risk and that filtered systems with high source water concentration must provide additional treatment. He also noted that all unfiltered systems must provide at least 2-log inactivation (or 3-log depending on source water concentration), and systems must complete implementation of toolbox options no later than 3 years following bin placement. Mr. Rotert stated that LT2 also addresses concerns with uncovered finished water reservoirs (UCFWRs).

Mr. Rotert discussed Source Water Monitoring Requirements. He stated that filtered systems serving ≥ 10,000 people do a monthly sampling for Crypto, E. coli and turbidity for 24 months. He noted that the second round of monitoring will start no later than April 2015 – October 2016, depending on system size and that all unfiltered systems must monitor for Crypto unless they provide at least 3-log Crypto inactivation. He commented that systems serving <10,000 People do E. coli monitoring biweekly for one year to determine the need for Crypto monitoring, and that if E. coli is above the trigger value, then conduct Crypto sampling (24 samples). He said the second round of monitoring will start no later than October 2017 for E. coli and no later than April 2019 for Crypto.

Mae Wu: Ms. Wu asked if it they only test for E. coli because Crypto and E. coli always occur simultaneously.

Ken Rotert: Mr. Rotert replied by saying Crypto testing is more expensive and that testing for E.coli is a way to provide a rough screen for Crypto in terms of cost savings.

Bob Vincent: Mr. Vincent noted that Crypto has a long time of viability, on the order of months, in the environment but E. coli does not, so how can they be sure that they are getting an accurate reading of Crypto levels if they are only looking at a bacteria that can die in three weeks?

Eric Burneson: Mr. Burneson responded by saying there is a correlation between Crypto and E. coli from previous monitoring and so this is an appropriate means for small systems to assess their vulnerability to Crypto.

Carrie Lewis: Ms. Lewis asked if large systems are required to look at both indicators.

Eric Burneson: Mr. Burneson replied yes the analysis done by the larger systems for both E.coli and Crypto in the first round of monitoring was used to establish the indicator relationship and informed the basis for small system monitoring of E.coli only.

Mr. Rotert continued his presentation on the different bin boundaries. He stated that Bin 1 is fewer than 0.075 oocysts/liter and no additional treatment is needed. He noted that Bin 2 is from 0.075 to less than 1.0 oocysts/liter and that 1 – 1.5 log additional treatment is needed depending on filtration in place. He went on to note that Bin 3 is from 1.0 to fewer than 3.0 oocysts/liter and that 2 – 2.5 log additional treatment is needed depending on filtration in place. Lastly he explained that Bin 4 is 3.0 oocysts/liter or more and that 3 – 3.5 log additional treatment is needed depending on filtration in place. Mr. Rotert commented that systems in Bins 2-4 select tools from a toolbox to use for additional treatment credits.

Carrie Lewis: Ms. Lewis asked if bins were part of the Agreement in Principle document. She then asked if there was an understanding of the limitations.

Ken Rotert: Mr. Rotert replied yes.

Max Zarate-Bermudez: Dr. Zarate-Bermudez asked if this was based on the infection dose.

Ken Rotert: Mr. Rotert replied that the requirements for levels of Crypto in the LT1 are based on the infectious dose, which tie in the risk levels that EPA have in place. In that respect they were because LT2 followed same base requirements.

Eric Burneson: Mr. Burneson noted that the method can't distinguish the infectious specie from the non-infectious or the viable from the non-viable, and the overall binning/treatment accounted for these method limitations for Crypto, but still was designed to reduce the associated risk.

Howard Neukrug: Mr. Neukrug asked if in the future they would we be looking at new methods for Crypto and can the bins be readjusted?

Eric Burneson: Mr. Burneson replied that there are new analytical techniques that are under development for Crypto that could potentially distinguish the viable species and infectious from the non-infectious, but they are a ways off from being available for wide spread use.

Ken Rotert: Mr. Rotert added that they did publish a revised method in early 2012, which helps recovering Crypto from source water.

Max Zarate-Bermudez: Dr. Zarate-Bermudez replied that cryptosporidiosis is a reportable disease, but in the last five years it has been most frequently associated with recreational waters. He then noted that this brings up an important topic Dr. Grevatt mentioned regarding the fact that there is a need to collaborate more with others because it is not only a drinking water issue, it also relates to the waste water sector and the recreational water sector**.**

Carrie Lewis: Ms. Lewis commented that she believes that the Agreement in Principle allowed for contemplation of changing the bin sizes.

Eric Burneson: Mr. Burneson replied that if a new method was developed that had better specificity or recovery that would require a regulatory change to require the new method to be used and that would also likely require a change to the bin levels.

Mike Finn: Mr. Finn continued the presentation on implementation. He noted that there is a staggered schedule that is based on system size. He commented that in terms of timeline schedule, systems should have completed all requirements. Schedule two for a system with 50,000 to 99,000 will also have a possible extension, but that the performance period is finished. He added that systems on schedule three, if they were given extensions, would be completed fairly soon. He explained that systems on schedule four should have been in compliance last month and that all systems have completed monitoring.

Mr. Finn continued on in regards to Binning Results and Predictions of Filtered Systems >10,000 people. He noted that the sources of data are the Data Collection and Tracking System (DCTS) binning report and that is retrieved from DCTS based on Round 1 monitoring data. Another source of data Mr. Finn mentioned was the Non-DCTS binning result that was provided by regions and states including grandfathered and "missing" system information. Mr. Finn added that systems providing treatment instead of monitoring is another source of data in addition to the Information Collection Rule (ICR) – three hundred fifty plants in systems serving ≥ 100,000. He explained that two more sources were Information Collection Rule Supplemental Survey Large Systems (ICRSSL) - forty plants in systems serving ≥ 100,000, and Information Collection Rule Supplemental Survey Medium Systems (ICRSSM) - forty plants in systems serving 10,000-99,999.

Mr. Finn explained a chart that showed the binning results and predictions of filtered systems serving greater than or equal to 10,000 people. He noted it was important to take away that 7.1% (123 out of 1733) are in Bin 2 and higher that actually have to provide treatment.

Mr. Finn continued by saying systems have the option of providing whole levels of treatment instead of monitoring. He noted that two hundred four filtered systems submitted Intent to Provide total 5.5-Log of Treatment Instead of Monitoring (equivalent to Bin 4) which included twenty-one systems serving >10K, and one hundred eighty-three systems serving <10K. He also explained that fifteen unfiltered systems submitted Intent to Provide 3-Log of Treatment Instead of Monitoring which included two systems serving >10K, and thirteen systems serving <10K. Lastly, Mr. Finn noted that fifty-one systems had unknown filtration status.

Mr. Finn provided an overview of the microbial toolbox. He stated that the Source Toolbox Components included the Watershed Control Program, which was comprised of 0.5 log credit for filtered sources and unfiltered systems not eligible for credit. Mr. Finn explained that it also includes Alternative Source/Intake Management, which was comprised of no prescribed credit and simultaneous monitoring for treatment bin classification. Mr. Finn noted that other tools were Pre-Filtration Toolbox Components, which included pre-sedimentation basin with coagulation with 0.5 log-credit for systems achieving 0.5 log turbidity reduction or state approved criteria and basins must be operated continuously with coagulant addition and all plant flow must pass through the basin. He commented another tool was the Two-Stage Lime Softening, which was comprised of 0.5-log credit for two-stage softening where chemical addition and hardness precipitation occur in both stages, in addition to all plant flow must pass through both stages. Mr. Finn explained there was Bank Filtration, which included 0.5-log credit for twenty-five-foot setback; 1.0-log credit for fifty-foot setback, aquifer must be unconsolidated sand containing at least ten percent fines; average turbidity in wells must be less than one NTU, and systems using wells followed by filtration when conducting source water monitoring must sample the well to determine bin classification and are not eligible for additional credit.

Mr. Finn continued the presentation on the overview of the toolbox tools and added Treatment Performance Toolbox Components that includes Combined Filter Performance which is 0.5-log credit for combined filter effluent turbidity < 0.15 NTU in at least ninety-five percent of measurements each month. Another component Mr. Finn mentioned was Individual Filter Performance, which includes 0.5-log credit (in addition to 0.5-log combined filter performance credit) if individual filter effluent turbidity < 0.15 NTU in at least ninety-five percent of samples each month in each filter and is never > 0.3 NTU in two consecutive measurements in any filter. Mr. Finn then stated the last component for treat performance and that is Demonstration of Performance, which includes credit awarded to unit process or treatment train based on a demonstration to the state with a state-approved protocol.

Max Zarate-Bermudez: Dr. Zarate-Bermudez stated that he noticed some systems are going to a 5.5-log reduction and asked what the concentrations of Crypto in those systems are?

Mike Finn: Mr. Finn replied that those are based on bin placements for those concentrations. That treatment level is the max that would be required. Similarly, with the unfiltered systems that is the max based on their source water monitoring.

Howard Neukrug: Mr. Neukrug thanked EPA for the Watershed Control Program and log credits, noting that he believes the clean water/safe drinking water log credit have been very effective and encourages anything they can do to do to give people an incentive to work on source water protection.

Mike Finn: Mr. Finn replied and said that a number of systems have used that as a best practice. He commented that there are additional filtration toolbox options, and that those include Bag or Cartridge Filters (Individual), which is up to 2-log credit based on the removal efficiency demonstrated during challenge testing with a 1.0-log factor of safety, or Bag or Cartridge Filters (In Series), which is up to 2.5-log credit based on the removal efficiency demonstrated during challenge testing with a 0.5-log factor of safety. Mr. Finn also mentioned Membrane Filtration, which includes log credit equivalent to removal efficiency demonstrated in challenge test for device if supported by direct integrity testing. In addition to that he noted there is Second Stage Filtration, which is 0.5-log credit for second separate granular media filtration stage if treatment train includes coagulation prior to first filter, and Slow Sand Filters, which is 2.5-log credit as a secondary filtration step, as well as 3.0-log credit as a primary filtration process and no prior chlorination for either option.

Mr. Finn noted that there are also inactivation toolbox components and those include Chlorine Dioxide, which is log credit based on measured CT in relation to CT table; Ozone, which is log credit based on measured CT in relation to CT table; and UV, which includes log credit based on validated UV dose in relation to UV dose table and reactor validation testing required to establish UV dose and associated operating conditions.

Mr. Finn stated that they did a survey of ninety-six public water systems that all used a variety of the tools in the toolbox.

Mr. Finn commented on training and technical assistance by EPA and the States. He noted that there were several things for training and assistance that included:

- Webinar series to introduce rule and requirements.
- Guidance documents, fact sheets, Small Entity Compliance Guide.
- Safe Drinking Water Act Hotline.
- Rule presentations and training at conferences and seminars (AWWA, ASDWA, and NRWA).
- Face to face training in each EPA Region.
- Toolbox treatment tools focused webinars.
- Training and technical assistance for analytical laboratories.

Mr. Finn noted that the compliance date for PWSs serving <10,000 was October 1, 2014, and the state may allow a two year extension for capital improvements.

Carol DeMarco King: Ms. King continued the presentation on SDWA Public Water System Enforcement. Ms. King went into an overview explaining that “assuring safe drinking water” is a longstanding EPA enforcement national area of focus. She noted that relevant SDWA authorities include Section 1414 which authorizes EPA to issue an administrative order or bring a civil action to require compliance with applicable requirements. Section 1431 authorizes EPA to take action administratively or judicially if a contaminant may present an imminent and substantial endangerment to the health of persons. Ms. King mentioned the flexibility exists in an enforcement context because the oversight agency and public water system (PWS) can negotiate a case specific schedule for the system to return to compliance. She continued by saying States and EPA may handle PWS formal enforcement matters administratively and/or judicially, and that relief sought in PWS actions includes:

- Install new treatment equipment to address maximum contaminant level violations.
- Improve operation and maintenance.
- Routine monitoring.
- Provide an alternate supply of water until contamination is remediated.
- Transfer system to a new owner/operator.

Ms. King continued with the National Drinking Water Enforcement Response Policy (ERP) and stated that EPA's Office of Enforcement and Compliance Assurance issued the ERP in December 2009 and it was created in consultation with States and EPA's Office of Water and Regions. She noted that it replaced the complicated rule-based significant noncompliance (SNC) prioritization with a more holistic, PWS-based approach, and that Enforcement Targeting Tool (ETT) was developed based on the ERP's principles to provide a single ranking score for each PWS with unaddressed violation(s).

Ms. King stated the ERP, which includes the ETT, is a management tool to help identify PWSs that rise to a level of national significance for enforcement. EPA and States discuss priority PWSs identified by the ETT on a quarterly basis to ensure they are addressed through return to compliance (RTC) or formal enforcement, and that States and EPA should not wait until a system shows up on the ETT list to take action to bring it back into compliance with SDWA and the National Primary Drinking Water Regulations (NPDWRs).

Joyce Chandler: Ms. Chandler continued the presentation and discussed the ETT Scores. She commented that the ETT Score identifies PWSs for enforcement targeting and that the scores for the PWSs are based on are unaddressed violations. She noted that both health-based and non-health-based violations are included and count for one, five or ten points and that PWSs with ETT scores >= 11 are priorities for enforcement. She mentioned that within six months primacy agencies must either return priority systems to compliance or initiate formal enforcement actions and that the ultimate goal is RTC.

Ms. Chandler discussed the enforcement results under ERP/ETT and explained that improved coordination with States includes memos issued since 2009 to further facilitate ERP implementation; development of additional tools to meet regional, state and program office needs; the decrease in the number of PWSs identified as enforcement priorities; and an increase in state enforcement actions to address priority systems. Ms. Chandler then referred to a graph that showed the overall decline in priority PWSs. The graph showed a drop from almost 9,000 all the way down to just over 2,000.

Ms. Chandler explained that if a PWS fails to meet its deadline to install Cryptosporidium treatment as required by 40 C.F.R. Section 141.713, then the ETT assesses five points and that a PWS would not become a priority for enforcement until it reaches eleven points.

Bob Vincent: Mr. Vincent asked to go back to slide forty-two that showed the graph of the overall decline. He asked if this showed the same system each five years or new systems.

Joyce Chandler: Ms. Chandler replied that it is mixed and varies in that some have been on there long time while some have dropped off, etc.

Mae Wu: Ms. Wu asked for clarification on systems whose priority are higher than eleven points and asked if there are a lot that are higher than eleven.

Joyce Chandler: Ms. Chandler noted that a few were between eleven and one hundred, but most of them are lower. She did mention that there are some that are over one hundred.

Mae Wu: Ms. Wu asked if the reports show a breakdown of the differing violations.

Joyce Chandler: Ms. Chandler replied that the report is sent out to states and it shows what the violation is as well as details on that violation.

Caryn Mandelbaum: Ms. Mandelbaum, Esq. commented that there are hundreds of drinking water systems that are in violation with Nitrate and Arsenic MCLs, and she is interested to know how and when does EPA intervene?

Sarah Pillsbury: Ms. Pillsbury commented that if you have a system that has failed to install the Crypto treatment by the deadline you give it a five. If there is an additional violation of the same thing, does it stay at a five?

Carol DeMarco King: Ms. King noted that for one violation it is five points. Nothing precludes oversight agencies from immediately intervening even before a PWS becomes a priority system under the ERP/ETT.

Joyce Chandler: Ms. Chandler added that when a system gets five points, once the violation has been in place for another year it goes to six points, and then another year to seven points.

<u>CONSULTATION ON DRINKING WATER TREATMENT COMPLIANCE FLEXIBILITY - ISSUES RELEVANT TO THE LONG TERM 2 ENHANCED SURFACE WATER TREATMENT RULE</u>

Eric Burneson; and Ron Bergman, Acting Director Drinking Water Protection Division, OGWDW

Peter Grevatt: Dr. Grevatt thanked everyone for returning after lunch. He noted they developed five questions that are up for discussion that might help frame the issues and put us in a good spot.

Discussion Questions:

1. The LT2 treatment compliance schedule provides flexibility by allowing for possible extensions, how do you think systems serving fewer than 100,000 persons could maximize the benefits of such extensions when seeking to annualize the capital investments?
2. What challenges have you observed or been made aware of with regard to systems in your states having trouble complying with the LT2 treatment compliance schedule?
3. What additional flexibility do you believe may exist with respect to treatment or management options as well as for timelines for implementing these options?
4. What are your recommendations about interim options for ensuring protection of human health and the environment under the rule without the use of enforcement action or an administrative order"?
5. What would be your response to those systems who have taken measures to install treatment in accordance to the LT2 rule to avoid non-compliance and might question why EPA is rewarding systems who delay actions to become compliant?

Eric Burneson: Mr. Burneson mentioned that question four is right out of the congressional language.

Caryn Mandelbaum: Ms. Mandelbaum, Esq. noted that the thresholds for contaminants was discussed. She stated that they have a lot of small water systems in California and it is unclear how EPA is working with the State agencies in regards to guidance to resolve nitrate problems.

Peter Grevatt: Dr. Grevatt commented that with smaller systems that deal with the health based violations, EPA has a goal within the recording structure to focus on smaller systems that are in compliance. He stated that ninety-two percent of systems are in full compliance. EPA helps focus on reaching out to small systems. He stated that the States take set-asides from the revolving funds and uses technical assistance providers that focuses on small systems. Dr. Grevatt said that this is an ongoing challenge not only in California, but many other parts of the nation, mostly with ground water systems where there is fertilizer use. He added that EPA knows the challenge although it hasn't been solved yet.

Wilmer Melton: Mr. Melton asked what size systems EPA is looking at where there is non-compliance. He asked if there is a published list and are the violations specific to certain areas of the United States.

Peter Grevatt: Dr. Grevatt explained that there are both large and small systems not in compliance. He noted that you could have a large system with a short term violation. Dr. Grevatt explained in a broader sense that there are more health based violations in smaller systems than large systems. He commented that EPA is not surprised by that based on resources, staffing and money available. He added that this is why the state revolving loan fund helps the small systems.

Ron Bergman: Mr. Bergman commented specifically on nitrate, noting that it was the small systems because that Rule has been around for twenty-thirty years, and the larger systems have already sought treatment. He added that the larger systems have installed treatment, and it is the small systems that can't afford treatment. He explained that as to where violations are geographically, that EPA has a data set/spreadsheet that can break down by violation, system type and county. He noted that it is on the website and still requires a degree of competency.

Peter Grevatt: Dr. Grevatt stated that it's certainly not just the small systems that are challenged with nitrates.

Randy Moore: Mr. Moore commented that Des Moines is not a small community, but what it lends itself to is the municipalities and all the other issues they have to contend with. Mr. Moore continued by saying the financial support for water issues tend to be pushed back. He stated that it is an issue they have to address, but as a city there are other things we have to put in front of it.

Peter Grevatt: Dr. Grevatt wanted to note that they were not in violation and that they spent a lot of money getting nitrate out of system.

Caryn Mandelbaum: Ms. Mandelbaum commented that assistance for small water systems is a priority and that someone had mentioned before that there is a limitation around land use and wondered if EPA can step in. Ms. Mandelbaum asked if it would it be possible for EPA to limit the number of systems able to come online, so the problems don't continue to arise. She clarified by saying this would be a way prevent the problems before they start, since it seems as though the small system doesn't have the capacity.

Peter Grevatt: Dr. Grevatt commented that he doesn't want to make the mistake of saying all the small systems are alike and all small systems are challenged with capacity and financial services. He added that there are plenty of small systems out there that are fully capable and compliant, but there are some that don't have a great deal of resources and small number of hook ups.

Eric Burneson: Mr. Burneson asked if Ms. Mandelbaum was asking if EPA has the statutory authority to prevent water systems going into operation to prevent land use that may result in contamination. He answered by saying no, EPA doesn't have that authority under SDWA to prevent new water systems from beginning operation, however he noted that EPA has the authority to make sure those new systems comply with drinking water regulations.

Chris Wiant: Mr. Wiant noted that his experience in Colorado is comparable with a lot of states. He said if it's a newly developed area that's part of the land use process, there should be an assessment as to whether or not they can effectively connect to water and sewer. Mr. Wiant added that it's a pretty rigorous process. He noted that if it's an existing system there is some local authority to be able to address that.

Bob Vincent: Mr. Vincent added that in incorporated cities and counties they don't always enforce it, but they could prevent the placement of a small water system with a duly passed ordinance.

James McCauley: Mr. McCauley said that South Dakota is rural and the water system covers the state. The smaller systems have problems being compliant so they are spreading the cost base and help them out a little more.

Jill Jonas: Ms. Jonas commented to the Council that what she is hearing is that there are unique situations in each state. She explained it's very important when working with the states to help small systems. She added that Mr. McCauley talked about the rural water systems in his state, and that they have thousands of small systems in Wisconsin, but that doesn't mean that there is a community close by where they can hook up.

Howard Neukrug: Mr. Neukrug commented that the first thing he wanted to mention is source water protection. He asked what EPA is trying doing in this regard. He asked if EPA is trying to reduce the Crypto and if so, will they do so by improving source water. He added that this is very important and we should look at more incentives.

Sarah Pillsbury: Ms. Pillsbury stated that to some extent she questions the direction because she has never seen a situation before where a rule has been established and then they have asked what the ways were around compliance.

Jeanne Marie Bruno: Ms. Bruno asked that of the small systems that aren't complying, is it because of money?

Ron Bergman: Mr. Bergman replied that is a combination of things--the amount of money to install treatment, or waiting until something will change. He added that EPA doesn't have a list of all the systems so he is unsure.

Carrie Lewis: Ms. Lewis followed up on Mr. Neukrug's thought to improve source water protection. She asked if EPA considered allowing the results of the upcoming sampling round to let a system reclassify their bin if there have been results to lower their classification.

Peter Grevatt: Dr. Grevatt noted they are taking notes.

Jill Jonas: Ms. Jonas asked if it is possible for EPA to chime in on what they think is possible?

Peter Grevatt: Dr. Grevatt commented that the Enforcement Office would be better suited to answer that.

Carol DeMarco King: Ms. King answered by saying EPA has enforcement discretion in terms of how we respond to violations. EPA will support the region or will work with the state partners. Ms. King stressed that they don't have discretion as to whether or not it's a violation, but they do on how to respond to and resolve it.

Howard Neukrug: Mr. Neukrug responded by saying he has no experience with the smaller systems or understands what EPA is trying to solve, but from a larger system point of view is that they look for more flexibility in source water protection. Great opportunity for utilities to go below the threshold and get additional log credit. Mr. Neukrug stated that only a certain percentage of them are viable and that should be considered in helping the utility.

Randy Moore: Mr. Moore asked Ms. King if she believed that they do not have enough flexibility or discretion, and if the answer is yes he noted he would like to know how she would like to see it change.

Carol DeMarco King: Ms. King responded that EPA has enough discretion and flexibility via enforcement. She added that the challenge is what Congress has tasked EPA with in this particular request is to look at options other than using enforcement to offer systems compliance flexibility when they have already missed a regulatory deadline and, thus, are already in violation. She noted that in an enforcement setting EPA can negotiate with systems to develop case specific schedules to return them to compliance.

Max Zarate-Bermudez: Dr. Zarate-Bermudez asked to go back to Ms. Bruno's question about how much is known about the problems within small systems. He noted that the CDC is preparing a cooperative agreement to be announced in 2015 that will target federally unregulated drinking water systems and look at the identification of gaps that prevent them for being more efficient; in the case of private wells perhaps there are homeowners associations that can participate in this identification of gaps.

Wilmer Melton: Mr. Melton noted that what EPA might be able to do is help those systems in need. He stated that if it's smaller systems or even larger systems, there is an education outreach component that needs to happen. He noted they should encourage those systems to speak to professionals that could help guide them through the issues they are having. There are a lot of opportunities out there and maybe they aren't aware, but could be better educated through EPA's guidance.

Bob Vincent: Mr. Vincent stated that for question four, you only have a certain number of options. He commented that naturally you would use of the most effective treatment, see how that goes and go from there. He continued by saying that the option about the protection of public health is really an administrative statement. He added that the problem with testing Crypto is it's a $500 test, and even though the viability shows half of them are viable you still have to see if they are really viable which costs more and can only be done by a few labs on live animals.. He added that the method recovery is sometimes poor and just because half of them are viable it kind of balances out with the half or more that are not recovered.

Carrie Lewis: Ms. Lewis responded with it is indeed possible and since 1993 Crypto detection on the waste water side has just about disappeared. She explained that they tested the raw and finished water and Crypto was only detected six times in the past twelve years. Since 1993 till two years ago, we tested twice a month for a total of five hundred twenty-eight samples in the past twelve years. You should give them the option to incorporate improvements in source water quality into their toolbox as much as possible.

Eric Burneson: Mr. Burneson asked Ms. Lewis for some clarification. He asked if she was asking for more source water protection log removal credits based on a decrease in the levels of Crypto found in source water monitoring between round one and round two. He asked Mike Finn what flexibility there currently is in the rule for more source water protection credit based on round one and round two monitoring.

Mike Finn: Mr. Finn commented that the rule is basically silent on the issue. He noted that given the issues with the method and the issues with the frequency of monitoring, EPA's recommendation is if it is a decision not solely on Crypto monitoring results. The rule is not explicit but they have recommended that a change in conditions in the source water needs to be demonstrated in addition to lower results found in the monitoring.

Eric Burneson: Mr. Burneson added that given the method limitations and variability you can't rely solely on two measurements and would need a change of conditions (such as the elimination of a wastewater discharge) to be confident that source water protection had been effective in reducing Crypto.

Marilyn Christian: Ms. Christian asked if all water systems come to the technical assistance providers for help or does EPA direct rural water to go to the ones that haven't complied?

Ron Bergman: Mr. Bergman noted that it's going to vary by State. He noted that they administer it and Congress directs EPA to do a competitive grant. He added that States can also use set-asides. He explained that a lot of times a State will call and say these systems are on our watch list, can you go out and visit them.

Marilyn Christian: Ms. Christian clarified that it's the State most of the time not EPA.

Peter Grevatt: Dr. Grevatt commented that the technical assistance providers do go out and seek ways in which to help different systems based on State requests, etc. The technical assistance providers aren't just sitting around waiting for people.

Jill Jonas: Ms. Jonas clarified that if she understands, if there is a possibility for putting that into the contracts that would be a consideration most seem to be recommending. From a State perspective, that is something we do incorporate. In regard to compliance, she noted that they do prioritize and it sounds like the Council is saying if EPA could do this that would be good as well.

Ron Bergman: Mr. Bergman commented that he thinks they did that for Arsenic a few years ago.

Mae Wu: Ms. Wu asked for clarification on source water protection. She stated she is wondering with technical assistance whether that assistance accomplishes better source water protection.

Robert Stewart: Mr. Stewart stated that they always go to the State and see what their priorities are. He added that for their small systems, they are ground water systems, but they are also trying to be responsive to the States. He added that that the $12.7 million dollars in grant assistance is a drop in the bucket. He commented that some States use it, some don't and some use it for other issues. He added that source water protection wasn't necessarily the emphasis of the last round.

Bob Vincent: Mr. Vincent asked to go back to question four, and asked about the one hundred deaths of immune-compromised folks that died of Crypto in Milwaukee outbreak. He explained that if there are three or four outbreak situations, a targeted message towards those vulnerable folks might be a good idea and that the CDC has a pre-cautionary fact sheet for immune-compromised persons on surface water systems.

Chris Wiant: Mr. Wiant commented that he wondered if they shouldn't put some of that burden back on that system in a different way. If they are working towards source protection in a meaningful way, if they can increase monitoring more robust communication system with constituents, there may be more response. At the end of the day it's about keeping that stuff out of this glass of water. Trying to use the compliance support and schedule to help them identify ways to ensure there is some level of protection going on - that is better than nothing. But for smaller systems, if they can't make the investment you can't squeeze it out of them. He noted that at least they have something this way and explained that you have to look at each individually. If they can't meet this requirement, their focus should be how they can provide safe water to their constituency, and compliance should be able to assist them with targets along the way but it won't happen overnight. He stated that the Committee is saying they know they can't do this in a manner that would normally happen, so they need to think about how they can work with them to make it better. Mr. Wiant noted they can't tell them what they have to do, but should ask what is it they can do to improve the safety of their constituents.

Jill Jonas: Ms. Jonas noted that there is some flexibility in the way SRFs are utilized in the States based on the greatest health risk.

Chris Wiant: Mr. Wiant commented that the State revolving fund reminds him of having scoring parameters in which someone becomes higher priority. He added that it can take a little pressure off the utility.

Jill Jonas: Ms. Jonas noted that they can also look at other areas within EPA for assistance, particularly under the Clean Water Act or other Federal agencies that may have funding and scoring or prioritizing. She added that the focus should be on the water being clean and safe.

Howard Neukrug: Mr. Neukrug noted that in regards to question four that SRF funding is greatly needed.

Bob Vincent: Mr. Vincent noted that he agrees with Ms. Mandelbaum's original suggestion regarding what the states can do in regards to new development being stopped as a way to negate issues before they arise. And that moratoriums are issued by states when resources or systems exceed their capacity.

Howard Neukrug: Mr. Neukrug mentioned to not forget the water systems.

Chris Wiant: Mr. Wiant added that he had one more comment on funding. He stated that they should take every opportunity to give more capital to the states to fund waste water/upgrades. They are trying to find a way to make more upgrades so somewhere they have to have some help. Revolving funds, low interest loan – he explained that whatever they can do to not give up their authority. It all boils down to having capital available to make these things happen.

CONSULTATION ON METHODS FOR SETTING STANDARDS FOR GROUPS OF CARCINOGENIC VOLATILE ORGANIC CHEMICALS

Lisa Christ, Chief of Targeting and Analysis Branch, Standards and Risk Management Division

Lisa Christ: Ms. Christ began by outlining the purpose of her presentation stating she would present the approaches for developing a maximum contaminant level (MCL) for a group of contaminants, and to obtain feedback on two approaches for a group MCL. Ms. Christ then presented an overview. She noted that in the presentation she would talk about:

- Why develop group maximum contaminant level (MCL) approaches.
- The carcinogenic volatile organic compound group (cVOC).
- Safe Drinking Water Act considerations.
- Two approaches and descriptions of advantages and disadvantages:
    - Group MCL development.
    - MCL compliance.

Ms. Christ went on to explain why EPA is looking at a group MCL approach. Ms. Christ commented that as Mr. Burneson mentioned, EPA just previously completed the Six Year Review and within that action, EPA identified two contaminants (trichloroethylene (TCE) and tetrachloroethylene (PCE)). She stated that EPA initially looked at a potential of up to sixteen cVOCs for this effort, which contained both regulated and unregulated, and that is where they started coming up with the approaches. She mentioned that in 2010 a Drinking Water Strategy was announced. In 2011, she mentioned that the cVOC regulation was announced, and that in 2013 EPA initiated a development of group MCL approaches. Ms. Christ explained the group characteristics for cVOCs. Those characteristics included all carcinogens (presumed all MCLGs would be zero). Another characteristic she noted was that no health interactions at levels found in drinking water and that cancer risks are additive. In addition to those, she stated that co-occurrence is possible - treatment can remove all cVOCs, but effectiveness can vary, and the common analytical method.

Ms. Christ then went through the Group MCL Framework and the Guiding Principles. The principles included:

- Comply with the requirements of SDWA.
- Efficiently account for risks of exposure to multiple contaminants in one regulation.
- Provide water systems with an opportunity to make the best long-term decisions on capital investments.
- Allows for future changes in health information or analytical methods capabilities to be incorporated in the group MCL.
- Provide a framework for EPA to address emerging contaminants in the future.
- Consistent methods for developing a group MCL for future regulations.

Ms. Christ explained that the Safe Drinking Water Act establishes criteria for MCL development. She stated the steps for establishing the criteria which includes:

1. Set maximum contaminant level goal (MCLG) based on health risk.
2. Set MCL as close to MCLG as feasible in terms of analytical methods and treatment.
3. However, can set MCL at higher level if benefits don't justify costs at feasible level.

Ms. Christ commented that based on the SDWA criteria, EPA developed two approaches. She noted that the group MCL must meet SDWA requirements to set MCL as close to MCLG as feasible. She explained that approach one was based on feasible level addition where the MCL is based on concentration, and approach two was based on risk-weighted feasible level addition where the MCL is based on risk. Ms. Christ explained that with approach one, feasible level for additions that the feasible level for carcinogens is done by setting the MCL as close as feasible to MCLG is limited by analytical method quantitation level [i.e. minimum reporting level (MRL)]. She noted that the group MCL is derived by adding the MRLs for each member of the group and that the group MCL is the total of all MRLs.

Ms. Christ then went on to state that compliance determination is when systems collect a sample; the measured concentration for each cVOC are added and the total of all concentrations are compared to the group MCL. Ms. Christ explained the advantages of the feasible level addition. She noted that the advantages included are straight-forward and easy to implement, and the compliance determination equation is not difficult. Ms. Christ commented that the disadvantages were that it doesn't take into account health risk variation between cVOCs; may require systems to install treatment for less risky members of the group resulting in minimal health benefit; and effects of adding emerging VOCs may change the group MCL.

Ms. Christ then went into details on approach two, risk-weighted feasible level addition which is done by multiplying the MRLs for each cVOC by its unit risk and total these values which results in an overall risk level for the group that cannot be exceeded, and to provide a risk "weight" for each cVOC which includes the unit risk divided by the total risk to derive the risk "weight". Ms. Christ explained compliance determination is when systems collect samples; the measured concentration for each cVOC are multiplied by its risk "weight", the total of all concentrations times its risk weight are compared to the group MCL, and EPA would provide the risk "weights" for compliance determination purposes.

Ms. Christ stated the advantages for risk-weighted feasible level addition are it accounts for risk variation across a group of contaminants with unit risks that vary by several orders of magnitude; will not impose undue burden on systems that do not offer much by way of health risk reduction; and systems that exceed the group MCL install treatment to reduce the riskiest contaminants to the group. Ms. Chris stated the disadvantages for risk-weight feasible level addition as the unusual approach (but similar to radionuclide beta emitters); changes in cancer slope factors may change the group MCL; and new cVOCs added to the group in the future may change the group MCL.

Ms. Christ asked if anyone had any questions.

Mae Wu: Ms. Wu noted that she had several questions and wanted to clarify some things. She asked if she heard correctly when Ms. Christ said that the minimum reporting levels (MRLs) that were shown are currently the MCLs.

Lisa Christ: Ms. Christ clarified that all the MCLGs are zero and that the current MCLs are set at five ppb. Ms. Christ noted that the practical quantitation levels were the basis for setting the MCLs.

Mae Wu: Ms. Wu noted that the way that it was presented made it look like it makes more sense to do it as risk weighted. The second approach was still problematic because in the example the TCP levels would have been high risk, that is 1 in a thousand, and yet, it would not trigger a violation. The rule is that the levels that at the MCL are in compliance even if that MCL is a high risk.

Lisa Christ: Ms. Christ stated that if EPA sets an MCL, the Agency would need to look at the cost benefit tradeoff.

Mae Wu: Ms. Wu noted that the numbers were throwing her off a little bit, and in the examples provided for system two, she noticed that the risk is high although they wouldn't have exceeded the MCL. She also noted that estimates of cancer risks change based upon new information.

Lisa Christ: Ms. Christ noted that these are the cancer risks at the feasible levels based on the current assessments. She also noted EPA doesn't revise risk assessments that often. She commented that the appropriate time to re-look at new health effects information would be the Six Year Review if new information became available.

Jeanne Marie Bruno: Ms. Bruno noted that she had very similar concerns as Ms. Wu. Ms. Bruno said it seems to be a moving target, MRL changes and the MCL changes.

Lisa Christ: Ms. Christ explained that when EPA did their 2nd Six Year Review, and found it was appropriate to revise the TCE and PCE standards because new information indicated the quantitation level was lower for these contaminants. She mentioned the cost benefit has to factor into that as well. If it is feasible to lower the MCL, EPA must evaluate if the revised MCL improves the health benefits.

Eric Burneson: Mr. Burneson explained that under either of the options, there are the improvements in public health protection. He noted that Ms. Bruno made a valid point and that EPA would need to undertake a rulemaking process and evaluate costs and benefits to revise an MCL if new scientific data showed further improvements were feasible.

Howard Neukrug: Mr. Neukrug stated that he thinks this is pointing out the problem of setting the MCLG as zero, and he states he believes that was fine ten years ago, but that now we are going down to ten to the sixth power and further so there is no end to this. He continued by saying the MRLs are get better and better and tighter and tighter. He stated that when he looked at the example that was given versus the risk number, it is clear that the TCP is a much more significant risk.

Eric Burneson: Mr. Burneson noted he was going speak to Mr. Neukrug's point regarding the MCLG being at zero. He explained that SDWA requirements for setting the MCL as close to feasible MCLG are offset by requirements that EPA evaluate the cost and benefits. This provides EPA with discretionary authority to avoid setting the MCL at the lowest feasible level if the benefits do not justify the costs.

He continued with Mr. Neukrug's second point and that was that TCP is the biggest driver of the group. Mr. Burneson commented that in the group of cVOCs there are varying risks among them and that TCP is the contaminant in this group that is riskier than others. He noted that one challenge EPA was trying to take on is trying to focus action in systems that had those greatest risks. He ended by saying that there will obviously be exceptions.

Lisa Christ: Ms. Christ commented that when EPA set the MCLs for individuals, if you are less than or equal to, you are in compliance. She mentioned that she doesn't see much of a difference if they were to determine whether or not a system has to treat.

Eric Burneson: Mr. Burneson noted that the risk weighted option introduces a consideration of the risk at the lowest level of quantitation, explaining that EPA believes this targets action to the systems with max risk.

Howard Neukrug: Mr. Neukrug commented that they aren't being clear and that they should understand one in one thousand risk is really bad.

Carrie Lewis: Ms. Lewis commented that between the two options that were presented that the risk approach seemed to be superior and she wondered if the decision point of the question wasn't regulating individually versus risk weighted groups? She mentioned that some of the things in the parameter analysis they can do are one and the same, and you can still have treatment techniques and then you are getting to a much more straightforward analysis.

Lisa Christ: Ms. Christ commented that when EPA set the MCLs for individuals, if you are less than or equal to the MCL, you are in compliance. The decision to install treatment due to a violation would not differ if an individual MCL or a group MCL was exceeded.

William Alley: Dr. Alley commented that when you start adding a bunch of things together with the methods you are losing track of the risk. He stated that it's hard to communicate the risk and it's really based on the methods. He noted that they are going to be regulating these contaminants at a much lower level of risk than they do other contaminants. He continued with his third point and asked what the real advantage of not saving analytical costs is? Dr. Alley questions why they should try and set things to an equal level of risk individually because he doesn't see advantage of the current methodology.

Kimberly Jones: Ms. Jones asked what the advantage of the overall approach was, in terms of monitoring. She noted that they have to evaluate the threshold regardless of what method they use.

Lisa Christ: Ms. Christ replied by saying if they regulate each one contaminant considered for the group individually it's still one analytical method. The original list of cVOCs under consideration may have required more than one analytical technique and that didn't seem to make sense. Monitoring frequencies are generally triggered based on past monitoring results and if decreased monitoring was determined, it would be for the whole group. Water systems are still going to collect a sample, go to the lab etc. The difference is saying I'm ok for A or B, versus I am good for all sixteen.

Chris Wiant: Mr. Wiant mentioned that if all the cVOCs are in the water at the same time you will still have a problem. He noted that he wonders what type of consequence that all of these operate on and does it create a whole new risk assessment. He noted if they assume there is any kind of interaction, it can raise a whole new set of questions that they aren't ready to answer. Mr. Wiant noted that in theory, they should do that anyway. He added that he is worried about independent consequences, aside from risk calculations if you really looked at the individual risks.

Lisa Christ: Ms. Christ responded by saying that's one thing they looked at when considering the different approaches. She added that they looked to see if there was independent behavior in the body. Ms. Christ commented that at low levels in drinking water they found that to be true. She added that they took the risk additive approach.

Max Zarate-Bermudez: Dr. Zarate Bermudez added he understands the concerns about the drinking water sector. He believes it is a situation where they have to think more in a multi-barrier approach and explained that at CDC they understand that in the last ten years the WHO (World Health Organization) has been working on water safety plans in different countries of the of the world to identify where the source of the problem is and how they can control this problem.

Mae Wu: Ms. Wu mentioned that she does think this a good approach.

Bob Vincent: Mr. Vincent commented that risk approach one is not a good idea. He added that he doesn't know if they have looked at other risk based methods, but that his state has found several chemicals that are very low chemical risk factors, that don't change that often. Mr. Vincent noted that if they are looking at a Six Year Review then a lot of things could change. He said that there has been a lot of progress in treatment, and a lot of progress in lab's abilities so public perception changes because that is a constant concern to them.

Jeanne Marie Bruno: Ms. Bruno told Ms. Christ that she knows she worked very hard on this, but asked how married was she to the idea? She asked if there was a chance she would stop and go individually.

Eric Burneson: Mr. Burneson replied by saying this is an approach that was worked very hard on, and EPA will continue to try and make this approach work. He added that they still have to pass through the rigors of a proposal and cost benefit analysis. Mr. Burneson noted that there are a number of factors that will be affect EPA's development of a proposed cVOC standard and that all of the factors will play into the decision.

Chris Wiant: Mr. Wiant asked if EPA has tried this formula with some actual data now and have they looked at individual systems?

Lisa Christ: Ms. Christ replied that they actually got some system data from New York that had 123-TCP, and that they did look at their actual monitoring data to test each of the group approaches.

Carrie Lewis: Ms. Lewis commented that the water utility job is to protect public health. She noted that they don't just look at a chemical or contaminant that is regulated, if it's in the water, what are the risks, etc. She reflected on the fact that in reference to the LT2 Rule it was noted earlier that they weren't able to unregulate a regulation that is promulgated and asked if this method did that.

Kimberly Jones: Dr. Jones asked if it would be possible to implement both approaches, in order to capture the most conservative value.

Lisa Christ: Ms. Christ responded by saying it sounds like what you mean is setting up dual MCLs.

Kimberly Jones: Dr. Jones commented that there may still be a case wherein approach one is more appropriate because it is more conservative. She noted that there should not be a difference in monitoring, collecting samples, etc. Dr. Jones mentioned that the difference would be how that data are treated, and if they are out of compliance with the most conservative value.

Lisa Christ: Ms. Christ responded that it's fairly complex. She went back to the example where she looked at both approaches side by side. She stated that system one would not be able to meet one of the two approaches and require installing a treatment at a very high price without achieving a high public benefit. Ms. Christ also explained that with system two, either approach works. Ms. Christ reiterated that trying to have dual MCL/regulations or two systems would be pretty complex and an implementation challenge.

Jill Jonas: Ms. Jonas commented that three years ago they thought this would be an easy group and then asked Dr. Grevatt if he had anything to add.

Peter Grevatt: Dr. Grevatt replied he didn't think so, except for NDWAC's continued assistance on this. He stated that the drinking water perspective was developed to improve efficiencies and in that spirit they need to understand where those opportunities are.

UPDATE ON CLIMATE-READY UTILITIES

David Travers, Director, Water Security Decision, Office of Ground Water and Drinking Water

David Travers: Mr. Travers began his presentation by saying climate change and climate change impacts have significant potential to jeopardize the ability of drinking water and wastewater systems to continue fulfill their environmental and public health missions. He noted that climate change is inevitable and it is important that we begin to adapt.

Mr. Travers continued by talking about the NDWAC Climate Working Group. He explained that in 2009, NDWAC approved the formation of a Working Group to evaluate "Climate Ready Water Utilities" The charge included:

- Developing attributes of climate ready water utilities.
- Identifying climate change-related tools, training and products to address utilities' short- and long-term needs.
- Identifying mechanisms that would facilitate the adoption of climate change adaptation and mitigation strategies by the water sector.

Mr. Travers noted that there were twenty members of CRWU Working Group which includes twelve from water utilities, three from state and local governments, and five from academic, environmental, and other organizations. He continued by adding that the federal partners included U.S. Army Corps of Engineers, Centers for Disease Control and Prevention, and Federal Emergency Management Agency. Mr. Travers then explained the Working Group's recommendations. He noted that they had eleven findings, twelve recommendations (slides 26-30), highlights of which are: create and implement a Climate Ready program; improve coordination on climate change among federal agencies and partners; strengthen and deploy decision support models and tools; integrate climate information into existing technical assistance initiatives; establish training programs for utilities; and develop adaptive regulatory capacity.

Mr. Travers discussed the continuum of “engagement” and that climate ready utilities respond adaptively based on local conditions, needs and capacity. He noted that there are two parts: Basic Engagement and Focused Engagement. Mr. Travers explained Basic Engagement as a general awareness and implementation of “effective utility management” choices and Focused Engagement as explicit, climate-related planning, and operational adaptation and mitigation actions and investments.

Mr. Travers mentioned that the CRWU Mission Statement is to provide the water sector with the practical tools and training to adapt to climate change by promoting a clear understanding of climate science and adaptation options. He explained that the climate ready tools and resources included the adaptive response framework, adaptation strategies guide, toolbox, extreme events workshop planner, and climate resilience evaluation and awareness tool (CREAT).

Mr. Travers said that the program grapples with how to appropriately address the issue of uncertainty. He noted that the first step is provision of impact forecasts which may lead to understanding and action. He continued with downscaling which includes the question--were they designed for decision making? Mr. Travers continued by saying that, according to some observers, adaptation strategies require more accurate predictions than are possible with current models, and that such predictions are a prerequisite for effective adaptation decision making. He noted that an emphasis on downscaling, and refining the models can result in a no-regrets or wait-and-see approach. He added that during the course of discussions, there arose a notion of robustness to design a piece of equipment to perform acceptably across a range of potential climate scenarios. He explained that this concept of robustness is a concept that continues to evolve.

Mr. Travers continued by saying uncertainty is the only certainty that there is, and that uncertainty stems from limited knowledge, randomness and human actions. He continued by saying that such uncertainty will persist indefinitely, and we can design a provisional approach to create awareness of potential impacts, adaptation and mitigation options.

Mr. Travers went on to explain the CREAT tool which indicates climate drivers, and the challenges and threats, and impacts. He noted that the tool contains a library of these threats and adaptation options.

Peter Grevatt: Dr. Grevatt asked how people responded.

David Travers: Mr. Travers responded by saying it depends on the specification of the utility. He commented that if it’s a more typical utility it’s much more challenging. He said it would be disingenuous of them to use one data point because there is so much variability. Mr. Travers highlighted the fact that the climate change projections are very broad, and in adapting measures it makes sense to consider that full range. He explained that because there is a great deal of uncertainty, there can be a challenge in communicating the variability.

Caryn Mandelbaum: Ms. Mandelbaum asked if when they first introduced the three scenarios did they list percentages and asked what those percentages were of.

David Travers: Mr. Travers responded that the data set is based on nine different model runs and that they generated monthly and annual projections for each of those models over each of the grid cells, followed by an analysis. He noted that CREAT uses three scenarios hot/dry, central, and warm wet.

William Alley: Dr. Alley stated that he knew it was a computer output, but presenting too many significant figures was problematic. He would like to know more about the methods for presenting the uncertainty.

David Travers: Mr. Travers continued by explaining in the beginning of the year, they selected twenty-two utilities to participate in a nationwide program. He noted they have done pilots in the past and each utility has committed to working with EPA for two to three years. He commented that the purpose of this project is to cultivate a peer to peer network.

Mr. Travers went into explaining another tool which only presents the climate projection data. He noted that it works by clicking on a region, for example the Southwest, and it lists and shows information on climate projections in the Southwest. He then stated that an additional tool is the Flood Resilience Guide which is a basic guide for water and wastewater utilities. He commented that the flood resiliency guide is a clickable PDF that also contains videos imbedded in the file.

Mr. Travers discussed the ongoing work and goal that CRWU continues to improve program tools. He noted that CRWU is providing training and assistance for pilot utilities using CREAT; they will continue updating CREAT and developing the Drought Resiliency Guide; and lastly make updates to Adaptation Strategies Guide to include information on sustainability, energy and cost.

Lastly, Mr. Travers reviewed the challenges which include:

- Interpreting and translating climate data into actionable data.
- More compelling incentives (bonds).
- Reaching small systems.
- Competing priorities relative to climate change.
- How to bring impacts on decadal horizons into current day thinking.
- Political dimension.
- Credibility.

Jill Jonas: Ms. Jonas commented that she was curious about the small system situation and if they were discussed.

David Travers: Mr. Travers commented that they have worked with smaller utilities before.

Caryn Mandelbaum: Ms. Mandelbaum noted that she wanted to make a recommendation based on what Mr. Travers said in regards to the tools they can provide, i.e. an agenda, email, rudimentary costs for adoption, etc. She stated that she recently worked with a city in California that is really interested in the benefits, in particular jobs, so this would be good information to provide as part of the overall tools.

David Travers: Mr. Travers noted that right now the CREAT tool does include a cost benefit analysis that is qualitative, but the new version will be quantitative. He explained that what they do in the analysis is quantify the cost of the benefits that are defined as avoided costs. Mr. Travers added that we welcome enriching the cost side of the tool.

Kimberly Jones: Dr. Jones commented to Mr. Travers on embracing uncertainty. She asked when evaluating potential models, is there any consideration in using a model that can quantify uncertainly versus a more complex model that may not be able to communicate uncertainty as well.

Dr. Jones also asked how they communicate the uncertainty to the utilities. She added that it might be difficult for them.

David Travers: Mr. Travers thanked Dr. Jones for her great questions. He explained that they do not develop any models, but rely on modeling from the IPCC dataset. He added that they have about twenty general circulation models and they took nine with the highest historic predicted value. He added that the way they address uncertainty as seen is by providing a range to a utility. He noted that it is really up to the utility and they consider it their job to present the range and to allow them to structure the adaptation plan around a central point they can focus on. Mr. Travers explained that climate readiness hinges on local conditions and it is hard to provide a framework for each and every utility. He added that it’s utility specific because of local climate change projections. Mr. Travers mentioned that they can’t underestimate the significance of local resources because there are so many variables on the decision making framework, they have to customize based on their local climate change.

Peter Grevatt: Dr. Grevatt added that the Administrator thinks this is great work. He added that if they talk about drought and flooding, then everyone is talking about that. Dr. Grevatt mentioned that there has been a tremendous willingness from systems large and small. He also noted that the other thing that has been impressive to him is the willingness of small system operators in emergency situations.

INTRODUCTION TO POTABLE REUSE

Michelle Schutz, Senior Advisor on Reuse

Michelle Schutz: Ms. Schutz thanked Jill and the Council. Ms. Schutz explained that she would first go over a background and overview of the Office of Water Activities and the water supply challenges. Ms. Schutz explained that in response to current water challenges including drought, cities and states are looking to augment their water supplies. She noted that a potential framework to maximize water availability conservation would include the following:

- Conservation.
- Water Efficiency.

- Consolidation.
- Alternate Water Supplies.
- Water Reuse.
    - Indirect Potable Reuse.
    - Direct Potable Reuse.

Ms. Schutz continued the presentation and explained Indirect versus Direct Potable and Potable versus Non-Potable Reuse. She explained that Indirect Potable Reuse (IPR) occurs when a utility discharges reclaimed water into surface water or groundwater supplies for the specific purpose of augmenting the drinking water supply. She added that Direct Potable Reuse (DPR), for purposes of this discussion, means the use of water from a regulated water reclamation plant or recycling facility (which may or may not include an engineered buffer such as tanks). Ms. Schutz also stated that Potable Water is water that has been treated, cleaned, filtered or disinfected and meets established drinking water standards, and Non-Potable Water is water that is not of drinking water quality, but which may still be used for many other purposes depending on the quality and need.

Ms. Schutz commented that if you consider reuse as an option that the ability to reuse water has positive benefits that are also the key motivators for implanting reuse programs. She mentioned that the water reuse drivers were water availability, climate change, population growth and climate independent water sources. Ms. Schutz stated that there are reuse guidelines. She said that in the U.S. water reclamation and reuse standards are the responsibility of state and local agencies. Currently there are no federal regulations. She noted that in 1980 EPA developed the first *Guidelines for Water Reuse* as a technical research report for ORD and that in 2012 the Guidelines were updated and mainly addressed indirect potable reuse.

Ms. Schutz explained that as of 2012, a number of states had adopted regulations, guidelines or design standards to cover direct or indirect potable water reuse (Examples include: CA, AZ, NM, TX, CO, FL, GA, VA, WY, WA). Ms. Schutz continued her presentation explaining the Office of Water Reuse activities. The activities include:

- Cooperative Research and Development Agreement (CRADA) with Camp Dresser McKee (CDM) Smith – Developing a compendium to the 2012 Guidelines on the state of play for potable water reuse.
    - Status: Scheduled to be complete in early 2015.
- Member of Project Advisory Committee for Water Reuse White Paper.
    - Provide oversight on a white paper being developed to inform a DPR Framework.
    - Goal of Framework will be to provide a source of information and expert judgment on potable reuse.
- Evaluating ambient water quality criteria for viruses.
- Currently collecting data on viruses in raw sewage with coordination of the FDA (FDA considers viruses to be an effective indicator for wastewater treatment). This will inform any additional activities regarding IPR and DPR.

Ms. Schutz concluded her presentation by mentioning the next steps. She stated the next steps would be to work with states to determine the need of EPA guidance on direct potable reuse and to provide an update to NDWAC at the spring 2015 meeting.

Jill Jonas: Ms. Jonas mentioned that EPA is developing a compendium, the DPR framework, and from there EPA is thinking of developing something that would help support the States.

Peter Grevatt: Dr. Grevatt commented that EPA was talking with a number of States, mostly trying to gauge their interest. He noted that EPA has mixed feedback from them. Dr. Grevatt pointed out that, as Ms. Schutz said, without question there are a lot of folks that are exploring different aspects of this.

Jill Jonas: Ms. Jonas asked if they had been approached regarding the multimillion dollar project for the framework.

Peter Grevatt: Dr. Grevatt replied yes, the Office was approached by Water Reuse and National Water Research Institute and wanted someone from our office on the project advisory committee.

Phil Oshida: Mr. Oshida commented that he was on the project advisory committee and they are providing a document which will be a precursor for the things they are working on now. He noted that the main thing that needs to be considered for a community that is looking into direct potable reuse is treatment trains. He mentioned that they are working a wide range of topics and creating a specific outline that should be completed in February or March.

Peter Grevatt: Dr. Grevatt said that they are not writing the document and they don't have a formal peer review of the document. He also noted that they are not endorsing the document.

Eric Burneson: Mr. Burneson added that he would like to rephrase what Jill mentioned as "multi-million". He noted that is in terms of non-EPA funding.

Jill Jonas: Ms. Jonas thanked Mr. Burneson and asked if they could explain the mixed reactions they were getting from some of the States in reference to next steps and thinking about doing the guidance.

Peter Grevatt: Dr. Grevatt responded that is from Wisconsin's perspective. He commented that there is a lot to do and what will happen next is to get NDWAC's perspective on what they should be doing. Dr. Grevatt mentioned that one perspective is that if they were to develop guidance, would that be perceived as EPA encouraging folks? He noted that is one thing they are thinking about a lot. He added that EPA is trying to look at all perspectives. Dr. Grevatt commented that if NDWAC has perspectives on where this falls in the activities we could be involved in what they would be very interested in hearing.

Caryn Mandelbaum: Ms. Mandelbaum explained that from a non-governmental perspective, she doesn't think EPA guidance could come too soon. She noted that all the agencies in California are debating between ocean, indirect potable use, etc. Ms. Mandelbaum commented that at the moment they are now putting those plans on hold. She added they don't want to waste money to create indirect potable lines now if it's going to be recommended that they use direct two, three, five years down the road, although they may not have five years to wait for new supplies. Ms. Mandelbaum ended by saying it's a critical piece of information for California.

Wilmer Melton: Mr. Melton added that he agreed with Ms. Mandelbaum in that EPA can't move quick enough to get something in place as they begin to look at drought conditions. He added that there are so many factors that he thinks are important. He added that he can speak specifically about Kannapolis and how they were looking at specific dual piping, but the problem is when you think about where you place these facilities, they were so far down stream that it wasn't cost effective. He noted if you begin to build the infrastructure, knowing what those standards are would be beneficial for everyone. This information would make States feel comfortable about what they are installing.

William Alley: Dr. Alley added that in the City of San Diego looked at this for many years, but he believes they are changing their heart quite a bit. He commented that he thinks the State of California is trying to develop and create standards so San Diego can move forward with indirect potable reuse. Dr. Alley also added that the definition of potable water doesn't include wells.

Max Zarate-Bermudez: Dr. Zarate-Bermudez commented he had an issue with the DPR definition and asked how it correlates with the drinking water standards as written.

Peter Grevatt: Dr. Grevatt replied one of the caveats he would offer about the definitions is they are still trying to work through this ourselves and it's not the final definition. He explained that they need to be careful in how they describe what they are doing so there is no confusion. Currently, there is a lot of confusion around the terms.

Jill Jonas: Ms. Jonas asked the Council if there were any further thoughts and then thanked Ms. Schutz.

Meeting Summary: November 07, 2014

UPDATE ON ACTIVITIES TO REDUCE NUTRIENTS AND ADDRESS ALGAL BLOOMS AND ALGAL TOXINS - INTRODUCTION AND EVENTS IN TOLEDO, OH
Peter Grevatt, Office Director, EPA Office of Ground Water and Drinking Water (OGWDW)

Peter Grevatt: Dr. Grevatt wished everyone a good morning and noted that he was delighted to have everyone there. He commented that he was excited about the next session because it was building on their last meeting and the conversation they had about Algal Blooms and Toxins. During last year's presentation, Beth Messer from the State of Ohio spoke of how the chief toxin produced by Western Lake Erie's 2013 algae bloom spiked at such extreme levels along the Ottawa County shoreline this week that it knocked the water-treatment plant serving 2,000 Carroll Township residents offline. Dr. Grevatt, at the time everyone was thinking, what happens if something like this occurs in a city like Toledo, and low and behold this exact thing happened. Beginning a recap of this experience, Dr. Grevatt next explained that they have made quite a bit of progress from last year. Last year they presented the information they had available on the website, asked if they had the right information to reach out to the public, and whether there was anything else they should be doing. He then commented that today's conversation would be different in that they would be talking about concrete work products they will be developing and go far beyond the information they have on the website.

Dr. Grevatt stated that he would first start with a brief recap of Toledo. He noted that it started on Friday night, Aug 1st, when the College Park Water Treatment Plant in Toledo had an elevated reading in their test kit close to the World Health Organization's (WHO) value they were told to watch for. That night they exceeded that value of one mg per litter in the source water plant and in the distribution system so they did some testing and confirmed the elevated value. Next, the State of Ohio reached out to EPA laboratory in Cincinnati and then the course of the weekend was quite dramatic. Dr. Grevatt commented that this should be no surprise to anyone what this looks like when the Mayor of a city serving 500,000 people has to issue a "don't drink, don't boil" order. He explained that it is not that uncommon if there is a boil order, but in this case they couldn't even do that, and by eight/nine am you couldn't find a bottle of water anywhere in Toledo or the neighboring communities. The Governor issued a State of Emergency and enacted the Guard who gave out water. Simultaneously, EPA worked with the State of Ohio and City of Toledo to try and understand what was going on in their system and how to remove the algal toxins from it. Dr. Grevatt noted that one issue they encountered early on had to do with sample operation and analysis. They used the Elisa method for preparing their samples in a way which they knew was very conservative. Toledo was lysing their cells to try and max the measurement of algal toxins; however, the problem was when EPA did the confirmatory sampling they weren't coming up with the higher value. Dr. Grevatt noted that they discovered on Saturday that the issue had to do with the preparation of the sample. Chlorine had been added to the samples which interacted with the algal toxins, which led to the understanding that they have to get to a common understanding on how to prepare these samples to better understand what is going on. He explained that the Cincinnati laboratory is a long way away from Toledo and consequently, the Governor activated State Police so that once they collected the samples they could be taken to the Toledo airport and flown to Cincinnati via helicopter. Once in Cincinnati, it was picked up and delivered to the staff reading the samples throughout the weekend/night. Dr. Grevatt commented on midnight calls between the Governor and the Mayor as they tried to figure out what was going on in their distribution system. By 4 a.m. on Monday morning the levels went down because of the wind direction which caused the algal bloom to move.

Dr. Grevatt noted that this event left a lasting impression on residents because they are used to being able to turn on the water, and it went from being safe one day and not the next. He stated that there were a couple of key things they need to address:

1. The State of Ohio was using WHO's values as their safe mark for determining what was safe and EPA does not have an ACL for algal toxins; however, they are getting a health advisory done for several algal toxins, all of which should be complete by the spring of next year.
2. Right after this event, they recognized that communities aren't familiar with the importance of quenching samples of chlorine so we distributed some guidance through the states and utilities to the community to educate everyone.
3. The Braxton test kit which is the widely used tool, is not specific to algal toxins so they are working on a more specific process for sampling algal toxins within the next few months, including a UCMR. He noted that the MS method takes longer to get a sample back, the equipment is more expensive, and fewer technicians are trained to use it. So they need to give some thought on how to use a screening test kit in advance of this more detailed method. He explained that a test kit takes four hours, while the MS method takes twenty-four hours.

Dr. Grevatt continued by noting that you can still find photos of Toledo on the web that were generated at the intake in which it shows someone at Lake Erie holding a glass of the water and it was bright green. He noted that there were source water protection challenges and infrastructure challenges, and they need to consequently make sure they have systems that are up to the task to take on algal blooms. He closed by saying the only other thing he would like to say is that he thinks the Council knows that they are not only concerned with drinking water in terms of algal toxins. There are recreational issues, pets that have died after going into recreational areas, etc. so there are a lot of issues they need to address.

Chris Wiant: Mr. Wiant asked for a brief version of what steps were taken to actually get the toxins out of the water.

Peter Grevatt: Dr. Grevatt noted that they had the issue of quenching the chlorine and explained that chlorine can actually be part of the solution for getting rid of the toxins, but at the same time you don't want to boost the toxin. He stated that they increased their use of carbon in the system to pull the algal toxins and used filtration steps as well.

Eric Burneson: Mr. Burneson added the bloom had migrated so the source water was changing and that the primary challenge was that there was a very high level.

Peter Grevatt: Dr. Grevatt replied that there are photographs available by National Oceanic and Atmospheric Administration (NOAA) about the algal bloom and specifically images of how the algal bloom migrated.

Jeanne-Marie Bruno: Ms. Bruno asked if when they achieved a sample that was at a low enough level, did they still have to ask their customers to flush their system.

Peter Grevatt: Dr. Grevatt replied that the focus was taking the samples in various locations within the distribution system and when they saw that every location achieved levels below the WHO levels they felt comfortable saying it was ok to drink.

Robert (Bob) G. Vincent: Mr. Vincent noted he was surprised they went with a "do not drink" on a health advisory guidance. He added that this is a multiyear exposure so he was surprised that they issued that considering the short term HHA (human health advisory) could be calculated to be a little higher than one ppb.

Peter Grevatt: Dr. Grevatt commented that the WHO values are the general population values with uncertainty factors. Studies themselves were not focused on children exposures so there was uncertainty on how it would affect sensitive populations, such as those with compromised immune system. The Governor and Mayor didn't want to take that risk on how it might affect these sensitive populations. He stated that they don't have a health advisory at EPA, but will be working with stakeholders to talk through how they best apply a health advisory like this situation. They will look to figure out what is the appropriate use of a health advisory in the short term and how long the problem might last.

Carrie M. Lewis: Ms. Lewis shared that she was in Chicago a month ago when the Mayor called a meeting of the Great Lakes Mayors. She explained that they were all very desperate for a number to know to help make that decision. They want a health advisory and need some number to help guide their advice to their constituents and residents. From Milwaukee's perspective, advisory level numbers really help you make decisions when levels are increasing.

Peter Grevatt: Dr. Grevatt replied that he was at that meeting as well and that he is going to a meeting the first week of December with the Great Lakes Environment Center to talk more about health advisory issues and address the progress that EPA is making on this. He noted that the most focus they have received from almost every segment of government has been regarding the need for a number. Stating that as EPA, we need to help the U.S. to help make a determination.

Carrie M. Lewis: Ms. Lewis added that she thought the thing that they missed was the interaction with health professionals. Mayors want to make the decision, but they didn't talk about folding in their health professionals to help them make those decisions and understand those numbers.

Peter Grevatt: Dr. Grevatt replied that they need to figure out what they should do and when those midnight situations arise, what make sense for tomorrow. He then commented that Ms. Lewis brought up a good point.

The Honorable Hilliard L. Hampton II: Mayor Hampton asked if in two months they will have a kit to identify the algal toxins that can be used for testing.

Peter Grevatt: Dr. Grevatt replied he needed to be clearer about sampling methodology and that currently a widely available test kit, the ELISA method, is quick but not specific so it's a broad use. EPA is finalizing a much more specific method that uses a sophisticated method; however, this won't be available until sometime next year. He noted that they are working with states to identify laboratories that have the capacity to test these. Stating he didn't know that they would recommend at a first cut that people go to that more sophisticated method.

Eric Burneson: Mr. Burneson added that the ELISA immunoassay is a widely available method and EPA's guidance identifies this as a screening method. Mr. Burneson clarified that some people have spoken about the need for EPA approved method which they don't currently have. Mr. Burneson stated that EPA expects to publish methods in January/February. This method will be an LC/MS/MS method which has greater specificity and precision than the ELISA test kit but it will not be as widely available until laboratories become proficient and therefore will not be available for general consumption just yet.

Randy A. Moore: Mr. Moore noted that one of the things that is typically done when faced with emergency is to try and step back and look at the lessons learned. He asked if EPA has a lessons learned from this particular event and is there something like an EPA Emergency Access Plan readily available for communities that they can reference and figure out what they need to do. Finally, in Toledo, was there something they could have done beforehand to better prepare?

Peter Grevatt: Dr. Grevatt replied that they have done a lot of work to address lessons learned for Toledo both from EPA and the state level. He noted that it was a galvanizing event in terms of awareness of algal blooms and the importance of addressing algal blooms. It caused a lot of discussion and collaboration on how can everyone can work together to put steps into place to avoid this in the future. He added that it led to a clear call that they need a number and method from EPA. He stated in terms of an off-the-shelf document, what will emerge is through EPA's website and tying together methods, health advisory and information pieces/recommendations on how to address these situations if they arise. He commented that by next spring they hope to have these pieces in place. The Administrator sees this algal bloom issue as a priority.

Dr. Grevatt stated that the last was the hardest question, and that everyone heard him say the day before that the infrastructure has $384 billion need over the next twenty years; part of that represents treatment systems. Toledo is one of those treatment systems in that they represent those who don't always have the resources to building it that way you want. They did the best with what they had. He explained that they did learn some things from Toledo like sample preparation, analysis and those kinds of tools. As a participant in the discussions, he shared that when you have a Governor and a Mayor at midnight on a Saturday trying to figure out when to tell their people they can drink their water, it is stressful. He closed by saying everyone was so professional, everyone just rolled up their sleeves and asked how can we fix this, it was a shared responsibility.

Carrie M. Lewis: Ms. Lewis added that some lessons are learned over and over. She commented that you can build it right the first time, have the expertise to offer it, have backups to the backups, and no matter how long we sit here we will never be able to guess what will happen next, but that set of preparedness efforts is what is key.

UPDATE ON CYANOTOXIN FACT SHEET, ANALYTICAL METHODS, UCMR4 AND CCL

Eric Burneson

Eric Burneson: Mr. Burneson stated that coming around the table was the Fact Sheet: *Cyanobacteria and Cyanotoxins: Information for Drinking Water Systems* (http://www2.epa.gov/sites/production/files/2014-08/documents/cyanobacteria_factsheet.pdf). He commented that the cyanotoxins listed on the CCL 3 are anatoxin-a, microcystin-LR, and Cylindrospermopsin. He stated that EPA is still compiling information to make a regulatory determination for the cyanotoxins including working to gather information on the health effects of cyanotoxins. Mr. Burneson explained EPA is also working to gather information on the frequency and level of occurrence of cyanotoxins across the country. Because of the high levels of precision needed for regulatory consideration EPA OW has been working in conjunction with our colleagues in ORD to develop some rigorous procedures by which laboratories can get precise measurements on the levels of these three toxins for the next round of Unregulated Contaminant Monitoring (UCMR4). He noted that the methods are in the laboratory validation phase and assuming that the laboratory validation studies go well, then they are on track to publish the LC/MS/MS methods in January/February 2015.

Mr. Burneson next commented on the ELISA kits that Dr. Grevatt mentioned are out there and available. He noted that EPA is still contemplating those methods for UCMR 4, but still recommends ELISA as a screening method. He explained that the goal is to have these methods out, available, and have them validated and have them be part of the proposal for UCMR 4. He then explained that the standard monitoring frequency for UCMR consists of quarterly sample surface water system samples, and semiannual samples for ground water systems. Mr. Burneson stated that the challenge is how they can cost effectively ask utilities to go out and monitor cyanotoxins when their occurrence is more episodic. Mr. Burneson shared that they are working with experts on a proposed strategy for the UCMR. Once EPA has completed UCMR 4 (which starts in 2018) monitoring they hope to have information about the frequency and level of cyanotoxins in drinking water across the country. He added that they recognize that 2018 is a long ways away which is why they have been working with colleagues to provide the information he just handed out.

Mr. Burneson explained the *Cyanobacteria and Cyanotoxins: Information for Drinking Water Systems* document had been modified since it was last shared with the NDWAC in 2013. Mr. Burneson, pointed out what information topics had been added after lessons were learned from experience working with the State of Ohio and the Toledo water system. He noted that one lesson was to be clearer about the procedures that sample collectors should undertake in preparing samples for transport and analysis. He directed everyone's attention to the bottom of page four, and page five of the document. EPA wanted to make sure that systems that are struggling with cyanotoxins in their drinking water at least have more consistent procedures for gathering information.

Lesley D'Anglada: Dr. D'Anglada added that she just wanted to touch on one of Randy's questions and stated that on page nine there is information on the importance of contingency plans/references to guidance that is way more specific.

Eric Burneson: Mr. Burneson noted that he wanted to make sure people know that they will continue to provide guidance to systems while EPA considers regulatory action for cyanotoxins. He added that EPA continues to think about how to help states that are not actively looking for cyanotoxins. EPA wants to give states and systems that are vulnerable to harmful algal blooms some indication that they may want to take some proactive steps. He stated that there is more work to come on that and that they will report out in the future as that guidance develops.

Robert (Bob) G. Vincent: Mr. Vincent asked if this was available online.

Eric Burneson: Mr. Burneson replied yes, *Cyanobacteria and Cyanotoxins: Information for Drinking Water Systems* (http://www2.epa.gov/sites/production/files/2014-08/documents/cyanobacteria_factsheet.pdf) it is available on the algal blooms webpage.

Lesley D'Anglada: Dr. D'Anglada referenced the document number at the end of page nine and asked if the Council would be getting a copy of her presentation.

Roy Simon: Mr. Simon replied yes, it will be part of the final summary.

OW OFFICE OF SCIENCE AND TECHNOLOGY PLANNED ACTIONS FOR HEALTH ADVISORIES FOR CYANOTOXINS

Lesley D'Anglada, Ph.D., Microbiologist, Health and Ecological Division, Office of Science and Technology (OST), OW

Leslie D'Anglada: Dr. D'Anglada began her presentation and explained that she would be discussing the development of a health advisory for the Drinking Water Advisory for cyanotoxins. Then noted that she would discuss:

- public health guidelines for cyanotoxins in place; and
- the toxicity assessment done for the three cyanotoxins listed in CCL.

Overview of Harmful Algal Blooms

- The prevalence and duration of Harmful Algal Blooms (HABs) in freshwater is rapidly expanding in the U.S. and worldwide.
- Some algal blooms can produce toxins at levels that may be of concern for human health and ecological impact.
- HABs have caused economic losses to the fishing and recreation industries while increasing costs for managing and treating potable water supplies.

Guidelines and Regulations for Drinking Water

- No federal regulations or guidelines for cyanobacteria or cyanotoxins in drinking water in the U.S.
- Candidate Contaminant List (CCL).
- Guidance values for drinking water have been adopted by 3 states.

State	Drinking Water Guidance/Action Level
Minnesota	Microcystin-LR: 0.04 µg/L
Ohio	Microcystin : 1 µg/L Tox Eq ; Anatoxin-a: 20 µg/L; Cylindrospermopsin: 1 µg/L; Saxitoxin: 0.2 µg/L
Oregon	Microcystin: 1 µg/L Tox Eq; Anatoxin-a: 3 µg/L ; Cylindrospermopsin: 1 µg/L; Saxitoxin: 3 µg/L

Guidelines for Cyanotoxins

- WHO 1998 (provisional).
    - Microcystins (based on LR) value for drinking water of 1µg/L and 20µg/L for recreational contact.
- Canada 2002 (final).
    - Total microcystins value for drinking water of 1.5µg/L.
- EPA NCEA 2006 (draft for drinking water).
    - Microcystin-LR short term/subchronic: 1.4 µg/L; chronic 0.1 µg/L.
- Cylindrospermopsin subchronic: 1 µg/L.
    - Anatoxin a: short term: 70 µg/L; subchronic 14 µg/L.
- Australia 2011 (suggested for drinking water).
    - Microcystin-LR: 1.3 µg/L.
- Cylindrospermopsin: 1 µg/L.
    - Anatoxin a: 3 µg/L.

DW Health Advisories (HA) for Cyanotoxins

Dr. D'Anglada noted that in 2012 they joined Health Canada in developing the health advisory; this is not a result of Toledo, they have been working on it for a long time. It was a very comprehensive review and that is why it has been two years in the making. The effort required a lot of research and discussions.

Microcystin-LR, Anatoxin-a, and Cylindrospermopsin:

- Joint collaboration with Health Canada.
- HA are non-regulatory concentrations at which adverse health effects are not anticipated to occur over specific exposure durations: one-day, ten-day, and lifetime.
- Includes:
    - General information and properties.
    - Occurrence and exposure.
    - Toxicokinetics.
    - Health effects data.
    - Quantification of toxicological effects.
    - Other criteria, guidance, and standards.
        - Analytical methods.
        - Treatment technologies.

Eric Burneson: Mr. Burneson commented that he thinks this health advisory, more than any other, presents clear implications. He stated that EPA plans to have discussions with stakeholders in the future on how they can make this information helpful for risk management officials such as yourselves.

Cyanotoxins Toxicity Assessment

- Health Effects Support Document.
  - Comprehensive Review of health effects information from exposure to cyanotoxins.
  - Includes a Quantification of Dose-Response.
    - RfD for microcystin-LR.
    - RfD for Cylindrospermopsin.
  - External and Internal Peer Review.
    - EPA currently addressing the comments.

Preliminary Human Health Assessment on Microcystin
Toxicity Assessment Summary:

- The toxicological database is almost exclusively limited to data on the MC-LR congener.
- Acute and sub-chronic toxicity studies confirm the liver, kidney and testes as target organs.
- Chronic toxicity studies have not observed clinical signs of toxicity.
- Reproductive and developmental toxicity studies showed decreases in sperm counts and a reduction in sperm motility after three and six months with severity increasing with longer duration of exposure.
- Research gaps identified:
  - None of the available studies are considered adequate for carcinogenicity assessment of microcystins.
  - Very limited information is available on the toxicity via inhalation exposure.
  - Limited information on the relative potencies of other microcystin congeners when compared to MC-LR.

Preliminary Human Health Assessment on Cylindrospermopsin
Toxicity Assessment Summary:

- Based on acute and sub-chronic studies done in mice, liver and kidneys appear to be the primary target organs for cylindrospermopsin toxicity.
- There are no chronic exposure studies on cylindrospermopsin.
- There are few studies on the genotoxicity of cylindrospermopsin, and there is some evidence of potential damage to DNA in mouse liver or causes mutations.
- Research gaps identified:
  - The chronic toxicity of cylindrospermopsin is unknown.
  - None of the available studies are considered adequate for carcinogenicity assessment of cylindrospermopsin.
  - No information on acute or chronic inhalation toxicity of cylindrospermopsin was identified.

Preliminary Human Health Assessment on Anatoxin-a
Toxicity Assessment Summary:

- The main known toxic effect of anatoxin-a is acute neurotoxicity.
- There are no cancer, genotoxicity, acute or chronic exposure studies on anatoxin-a, thus there is inadequate information to assess carcinogenic potential.

- Not enough information on sensitive endpoints and associated dose-response relationships to develop an RfD.
- Research gaps identified:
    - No acute oral studies using purified anatoxins could be found.
    - No chronic oral studies have been performed.
    - There is no information on carcinogenicity in humans or animals or on possible carcinogenic processes.
    - No information regarding mutagenicity or genotoxicity of anatoxin-a was identified.

Robert (Bob) G. Vincent: Mr. Vincent thanked Dr. D'Anglada for putting the presentation together and noted that it was critical for everyone that has a surface water plant in their jurisdiction/under their management. He then asked if they plan to differentiate between adults and children in the advisory.

Lesley D'Anglada: Dr. D'Anglada replied that their template does include a formula to divide for children and adults, so yes.

Robert (Bob) G. Vincent: Mr. Vincent asked if they will notify people of the external review timeframe and/or will NDWAC send the Council a notice or is there an email list you can get on to receive updates.

Lesley D'Anglada: Dr. D'Anglada replied they will be using this forum (the Council) for outreach and communications.

Peter Grevatt: Dr. Grevatt added that the external review piece, as Dr. D'Anglada said, EPA has gone through two rounds of independent peer review. This is more trying to talk through the implementation questions. There is a whole separate issue of what should communities do with that health advisory in terms of the decisions they should make if they have toxins in their drinking water.

Lesley D'Anglada: Dr. D'Anglada replied it is an external comment period, not peer review.

Mae C. Wu: Ms. Wu noted she was confused about Ohio and Oregon, and how they were able to develop a number for algal toxins but the EPA said there isn't a number.

Lesley D'Anglada: Dr. D'Anglada replied that they used both the WHO and the NCEA 2006 risk assessments to develop a number, but from EPA's point of view the study is not adequate enough to develop a number.

Randy A. Moore: Mr. Moore asked if there are any directives for the other states to develop guidelines or to add to that; is there a discussion on EPA's level to just push something out that is maybe a template.

Lesley D'Anglada: Dr. D'Anglada replied that drinking water health advisories are non-regulatory so the states can adopt them and use them to develop their own.

Eric Burneson: Mr. Burneson added that a health advisory is separate and distinct from promulgating an MCL. A health advisory is information we provide to states/localities to consider as they are dealing with elevated levels. We make it available and encourage its use, but we have no authority to enforce it.

Randy A. Moore: Mr. Moore added a lot of times things are done after the fact.

Peter Grevatt: Dr. Grevatt commented that in his opening comments on this topic, there has been a resounding call from a very wide set of stakeholders for EPA to develop a health advisory. So this is much more than a pull then a push. He noted that EPA is trying to be responsive to the resounding demand. It's not unusual that EPA will take the process to evaluate some compound, decide not to regulate it, but develop a health advisory for those who might be affected by it. This is about trying to provide information to states as quickly as possible so they have some information to support them.

Max Zarate-Bermudez: Dr. Zarate-Bermudez noted that according to slides four and five, Minnesota has a guideline of 0.04 µg/L and Australia 1.3 µg/L, and asked to explain why this might be happening?

Lesley D'Anglada: Dr. D'Anglada replied Australia used the same subchronic study, as the WHO, while Minnesota used a different study. When you use different studies, the value will be different. In addition, the parameters for the derivation of the guidelines are different.

Max Zarate-Bermudez: Dr. Zarate-Bermudez asked if both studies were based on exposure to adults.

Lesley D'Anglada: Dr. D'Anglada replied yes, the guidelines are based on adult's exposure.

<u>EPA NUTRIENT REDUCTION ACTIONS AND OPPORTUNITIES FOR SOURCE WATER PROTECTION</u>

Tom Wall, Director, Assessment and Watershed Protection Division, Office of Wetlands, Oceans and Watersheds

Outline

- National Scope of Nutrient Pollution.
- Public Health and Aquatic Impacts.
- Our Goals and How We Will Get There.
- Nitrogen & Phosphorus Sources.
- Call to Action: Helping State Progress via Nutrient Frameworks.
- Looking Ahead.

Tom Wall: Mr. Wall commented on the first set of pictures on slide three and commented that this focuses on a big problem, well-documented problem and a growing problem. As population grows more food is grown; more food creates bigger issues.

National Scope of Nutrient Problem

- Well Documented Problem and Impacts, e.g.:

- EPA: Science Advisory Board (2007), Wadeable Streams and Lakes Assessments (2006, 2008).
    - National Coastal Condition Report III (2008).
    - National Research Council: Mississippi River Water Quality (2008), Urban SW (2008).
    - USGS: Impact of Nutrients on Groundwater (2010), SPARROW Loadings (multiple).
    - Many published articles, State and university reports.
    - State EPA Nutrient Innovations Task Group (NITG) *Call to Action* Report.
- 15,000 Nutrient-related Impairment Listings in forty-nine States-an underestimate.
    - 2.5 Million Acres of Lakes and Reservoirs and 80,000 Miles of Rivers and Streams.
    - >47% of Streams have Medium to High P; >53% have Med to High N.
- 78% of Assessed Continental U.S. Coastal Area Exhibits Eutrophication Symptoms.
- One hundred sixty-eight hypoxic zones in U.S. waters.
- Public health risks:
    - Contaminated drinking water is significant & costly.
    - Rate of nitrate violations in community water systems doubled over the past seven years.

Jill Jonas: Ms. Jonas thanked Mr. Wall for accommodating the Council's schedule and for his presentation.

William Alley, Ph. D.: Dr. Alley stated that he never heard the word ground water throughout the presentation and wondered how that factors into Mr. Wall's work.

Tom Wall: Mr. Wall replied they don't have direct letters to reach ground water in the Clean Water Act, but they are very aware that ground water is a problem, very aware of the nexus.

Sarah Pillsbury: Ms. Pillsbury asked what supports the emphasis on green infrastructure (infiltration) as a "fix all" solution? She then asked whether EPA is thinking of establishing criteria where infiltration would not be good choice due to unacceptable risk of contaminating groundwater?

Tom Wall: Mr. Wall replied that Dr. Grevatt reminds them of that regularly, especially in regards to storm water runoff. He noted that for future population this issue is something to be mindful of as folks are looking at this and they are seeing major effects.

Mae C. Wu: Ms. Wu noted that there are States doing interesting things with nutrient management etc., and asked if Mr. Wall could give some examples. She added that she was curious what they are currently doing with USDA and what broader coordination looks like in the future.

Tom Wall: Mr. Wall replied that he would hate to shine a light on a few states, because there are so many doing great things. For example, Maryland is going to work with the Army Corps of Engineers. He added that they are looking for opportunities to trade in between communities and farmers to address very defensible, low-level standards of phosphorus pollution. Additionally, there is the USDA National Water Quality Initiative which will work with farmers and ranchers in one hundred seventy-four small watersheds throughout the Nation to improve water quality through the implementation of conservation systems to reduce nitrogen, phosphorous, sediment and pathogen contributions from agricultural land.

Jill Jonas: Ms. Jonas mentioned focusing grants on drinking water and explained that she was thinking about what her office can do on the drinking water issues with phosphorous and nitrates. She noted the need to protect sources of drinking water at the same time and ensure drinking water is one of those focal points, and commented that anything EPA can do to encourage prioritization and focus on sources of drinking water is certainly encouraged.

Caryn Mandelbaum, Esq.: Ms. Mandelbaum noted that given the severity of the health risks related to nitrate contamination in drinking water, she wondered if there is an opportunity to pin point areas where ground water basins are better than surface waters, and use the Clean Water Act to better control the source of water at the intersection thereby improving the nitrate problems at least in that area. She added that hopefully, over time, they will be able to get the ground water nitrates under control as well.

Max Zarate-Bermudez: Dr. Zarate-Bermudez commented that waste water treatment systems may be contributing to the problem, noting that through his work at the CDC he has worked with both centralized and decentralized waste water treatment systems. However, the problem is they blame each other regarding the release of nutrients to the environment.

Tom Wall: Mr. Wall replied in some areas yes and stated that Chesapeake Bay has a great handle on their onsite systems, etc. and is a major contributor for their small water ways through onsite system contributions. However, there is no question that in some areas it’s a major part of the concern.

Chris J. Wiant: Mr. Wiant added that in Colorado, the watershed argument continues with who is responsible. Natural tension occurs regarding who is responsible for what. He added that there have been some good studies about how onsite systems have contributed (or not) and what that leads to, and how this allows certain outside systems to start planning for that and raise the bar of what type of systems are allowed.

Tom Wall: Mr. Wall replied that Florida joined an investment project because onsite systems are a big problem and are consequently trying to get them hooked up to the sewer systems.

<u>UPDATE ON ACTIVITIES TO REDUCE NUTRIENTS AND ADDRESS ALGAL BLOOMS AND ALGAL TOXINS</u>

Key Question for Discussion

- Are EPA activities to reduce nutrients and address Algal Blooms and Algal Toxins the activities that EPA should be implementing?

Peter Grevatt: Dr. Grevatt noted he would like to draw everyone’s attention to the question on the agenda and add that to what they are looking for from the Council. He stated that yesterday he discussed different ways they engage with NDWAC and how sometimes they have a specific

charge that is very formal. He then added that the request on this item is for a letter from NDWAC to the Administrator, noting the question listed is the key issue that he wanted them to focus on.
Effort should include:

1. Suggestions on what NDWAC thinks about EPAs approach to methods or health advisories.
2. Are there things EPA is not doing related to algal toxins that NDWAC thinks is really important for EPA to be focused on.

He further explained that what they want to try and do is get a letter from NDWAC in time to discuss it at the next meeting, with the intent of having a spring meeting.

To begin the process, Dr. Grevatt suggested that the Council gather some more information from EPA and have conference calls in the interim, and have a letter by the spring meeting. He added that if the Council Members see things or are aware of things that would make sense for people to do, EPA wants to know that. He noted that the Administrator believes this is a tremendously important issue and they want the Council to help us to focus on what the important aspects are.

Mae C. Wu: Ms. Wu asked if he was talking about things the Office of Ground Water and Drinking Water can do or EPA at large.

Peter Grevatt: Dr. Grevatt replied that this is absolutely a joint effort between many offices within EPA and other agencies, and that he doesn't see it just limited to the Safe Drinking Water Act, adding a good place to focus is where safe drinking water and clean water could collaborate.

Mae C. Wu: Ms. Wu asked if there is some kind of intermediate method that would provide an early warning that is easier than looking at the microcystins, and if that was something EPA could be working on.

Peter Grevatt: Dr. Grevatt replied there are reports suggesting that the best indicators of microcystins are nitrogen and chlorophyll; however, EPA isn't at the point of offering guidance to drinking water systems yet saying look at these things, but it is something being looked into.

Howard Neukrug: Mr. Neukrug commented that he doesn't think they are coming to grips with this issue of nutrients. The road to success is what has been done in the Chesapeake. He added that he thought the problem is bigger than EPA and their jurisdiction, and until the Nation/Congress recognizes this issue as a whole, it won't be resolved. He noted that he thinks the answer is bringing in the other agencies/new laws to get to those non-point sources.

Peter Grevatt: Dr. Grevatt replied that the Administrator recognizes this is an issue they have to be working with other agencies on. This is something we are aware of.

Sarah Pillsbury: Ms. Pillsbury commented in terms of voluntary, she assumes everyone is aware that there is a Source Water Collaborative that has done some great work on how to communicate with the people when trying to get them to commit. She added that she doesn't think anyone was focused on the new information regarding nitrogen possibly being an indicator for places where there are some voluntary things happening. There is a toolkit that is going to be issued about how to use the Clean Water Act tools to achieve safe drinking water results. She added that she thinks there are some things that can be done, they have a lot of systems that have had algal blooms for a long time and they have no idea if they are harmful or not. She concluded that they need to get a better handle on that.

Chris J. Wiant: Mr. Wiant stated that this brings up the notion of public education, adding that they now have an example of where they can make this issue of nitrogen a priority because a community couldn't drink their water. He explained if EPA is crafting any kind of message they should take advantage of what happened and do some educational efforts to help people understand this is one challenge of not addressing nutrient contamination.

Peter Grevatt: Dr. Grevatt replied there are plenty of folks who recognize this as an event that points to making further progress on these issues; however, he doesn't believe there is any one individual who can point to the source of the problem because there is a lot they don't understand. However, he noted there are clearly things they recognize as contributors like nutrients. Dr. Grevatt commented that it really isn't acceptable what Toledo has gone through and EPA is trying to learn as much as they can from this and get others to seize the opportunity and recognize this is something that has to be dealt with.

Caryn Mandelbaum, Esq.: Ms. Mandelbaum asked if they are working with NOAA to watch all the waterways and look for algal blooms.

Peter Grevatt: Dr. Grevatt replied yes they are working closely with NOAA and the States to use their tools and provide advanced notice of what is going on in their waterways.

Lesley D'Anglada: Dr. D'Anglada added that NOAA covers the coastal areas of the United States, and ORD has a project with NOAA and NASA to create a new algorithm that cover fresh water sources.

Jill Jonas: Ms. Jonas noted she had a question on the procedure for moving forward and how they should proceed in providing advice to the Administrator.

Peter Grevatt: Dr. Grevatt commented that he would like to ask Mr. Simon and Ms. Schutz for a little help in terms of identifying a process for developing a letter. He noted he would suggest there might be a subset of the Council Members who want to take the lead, and try and frame out some of these issues. He commented that a set of people might spend some time on questions for the Agency regarding things you need to know. Dr. Grevatt added that EPA will make themselves available to the group to answer any follow-up questions to begin to frame everything out. NDWAC is a fortunate organization in the sense that the people around the table are very brilliant and have a lot of ideas.

Roy Simon: Mr. Simon replied not having discussed this in great detail, he would like to point out that a year ago they had a discussion about this with their FACA lawyer. Mr. Simon explained that when a FACA group needs to make a decision, the decision has to be made open to the public, but they can prepare for that through smaller group processes and then go through the public process. Mr. Simon said that once you decide on the letter-that has to be done in public.

Peter Grevatt: Dr. Grevatt noted that this is a small complication, but it's really not that complicated. It's the same process for FACA groups across the Nation.

Mae C. Wu: Ms. Wu stated that Mr. Burneson had talked about how the UCMR is more than five years away from being completed and asked if they are bound by statutory law to follow those timelines to get the toxins regulated. She also asked if there was anything that is not statutorily based so that they could move the process along more quickly than the process allows.

Eric Burneson: Mr. Burneson replied that there are a couple of things that could be done. He stated that they could ask for a voluntary submission of occurrence data. He explained that there are ways they could expedite that, it is possible or they could try and create a separate rule making for monitoring in advance of the UCMR. He noted, however, that the likelihood of expediting this though is small.

Chris J. Wiant: Mr. Wiant asked if there are things you think we could emphasize to the Administrator to serve their purposes. He noted that the letter shouldn't just be their feedback; the sub-Work Group should be thinking about how they can support the staff.

Peter Grevatt: Dr. Grevatt replied that he appreciated what Mr. Wiant was saying, but they would really prefer for the sub-Work Group to highlight what they believe to be important.

The Honorable Hilliard L. Hampton II: Mayor Hampton asked what type of money or resources EPA is putting towards education and awareness of toxins, noting that other causes like alcohol and tobacco have changed the way people think about these things in a real way through campaigns. He added that in the letter they can't do enough to raise public awareness regarding how important and negative effects of these toxins are. He commented that although these are advisories and at the end of the day it's the laws that effect change, raising awareness can definitely help.

Caryn Mandelbaum, Esq.: Ms. Mandelbaum stated that she didn't want to create more work; however, wondered if they are looking at the amount of money that has been dedicated to awareness. She noted she wonders if they can compare that to the problem that happened in 1993 in Milwaukee, and bring that dollar value to 2014 to get a comparisons of how much money is worth throwing at an emergency awareness situation.

Peter Grevatt: Dr. Grevatt asked if she was talking about the number of staff, contract dollars and resources, and other partners. He added that in Milwaukee they were given resources from the State and Federal, not just EPA.

Caryn Mandelbaum, Esq.: Ms. Mandelbaum replied that she thinks it would be helpful to have both; whatever amount they can gather in the next month would be helpful.

Peter Grevatt: Dr. Grevatt replied that he will have to check what information they have dating all the way back to 1993, but will see what he can do to provide some context.

Jill Jonas: Ms. Jonas asked if there were two to four Council Members willing to work on the draft. (*Howard Neukrug, Sarah Pillsbury, Mae C. Wu, Caryn Mandelbaum, Esq., and Wilmer Melton, III volunteered.)*

Max Zarate-Bermudez: Dr. Zarate-Bermudez asked if liaisons could be part of the process.

Jill Jonas: Ms. Jonas replied no, it has to be Council Members; however, if there are questions they can ask a liaison.

Roy Simon: Mr. Simon replied yes, there is no prohibition to talking to each other.

Peter Grevatt: Dr. Grevatt noted that they very much appreciate the willingness of the Council Members to help, adding that it is tremendously helpful to have that diversity of perspectives.

Jill Jonas: Ms. Jonas asked regarding the process moving forward, do they work with Ms. Schutz if they have any questions.

Michelle Schutz: Ms. Schutz replied yes.

Caryn Mandelbaum, Esq.: Ms. Mandelbaum asked if they could have Ms. Schutz's contact information.

Michelle Schutz: Ms. Schutz noted that when she gets back into the office she will send her contact information to everyone and encouraged everyone to reach out to her if they need anything.

Howard Neukrug: Mr. Neukrug asked if the very specific questions that need to be addressed in the letter, are they written anywhere.

Peter Grevatt: Dr. Grevatt replied they will follow up and provide those.

PRESENTATIONS FOR TERMS OF SERVICE AND POSSIBLE FUTURE ISSUES FOR COUNCIL'S NEXT MEETING

Peter Grevatt: Dr. Grevatt noted he wanted to take a few minutes before lunch to recognize the contribution of a number of members who are wrapping up their terms.

- First is Chris Wiant. Dr. Grevatt commented that they have a plaque thanking him for his service and a letter. He commented that Mr. Wiant's work has been so rewarding and they were very appreciative.
- Second is Mae Wu. Dr. Grevatt stated that he knows that it's a challenge to find the time to participate in NDWAC and especially difficult for folks in the nonprofit sector. He thanked Ms. Wu and noted he very much appreciated her willingness to stick it out.
- Next is James McCauley, all the way from South Dakota. He articulated how much he appreciated and thanked Mr. McCauley for his work and service to NDWAC.
- Next is Jeanne Marie Bruno. Mr. Grevatt thanked her and mentioned this was his second meeting and he was very impressed with Ms. Bruno's contributions and suggestions and the way in which she offered them.

- Next is Bob Vincent from the great state of Florida, noting this is a state they do a lot of business with and Mr. Vincent's contributions have been very much appreciated. Dr. Grevatt shared that they have learned quite a bit from Florida.
- Last, but certainly not least, Dr. Grevatt thanked Ms. Jonas and explained that the way he met her was at an ASDWA meeting. He explained that she came up to him at a break and said NDWAC is so important and so much can be done/should be done, so I told her she should be Chair. Dr. Grevatt thanked her and reminded everyone that this means there is an opportunity to serve as the Chair for remaining members.

Jill Jonas: Ms. Jonas asked if he had anything he would like to discuss in terms of future areas of focus.

Peter Grevatt: Dr. Grevatt replied that there are some future issues on the horizon, but would like to make a disclaimer that this is not a comprehensive list: harmful algal blooms and our request to have a letter at the spring meeting; the Lead and Copper Working Group will be ready to report out to the NDWAC; there are a number of regulatory activities that they are going to take some time on to make sure they get it right like lead and copper, and perchlorate. He added that this is an opportunity for NDWAC to engage and talk about where they are headed.

Jill Jonas: Ms. Jonas asked if anyone had any thoughts or questions, but no other ideas were provided.

PUBLIC COMMENTS

Jacqueline Tiaga, Program Coordinator, Federal Affairs, The Humane Society of the United States

Jacqueline Tiaga: Ms. Tiaga commented on behalf of The Humane Society of the United States, the largest animal protection organization in the Nation. I would like to thank the Environmental Protection Agency and National Drinking Water Advisory Council for holding this meeting. As a Harmful Algal Bloom Task Force Partner, the HSUS is particularly interested in and supportive of the Council's work on harmful algal blooms, otherwise known as HABs.

As many of you know, there are over 15,000 bodies of water across the country with issues related to nutrient pollution, affecting all 50 states. While this is a serious concern with regards to safe drinking water, we ask you to also consider how pets, particularly dogs, are adversely affected. In 2013, a toxins report on select veterinary hospital records discovered 368 cases of cyanotoxic poisoning found in dogs between the late 1920's and 2012. This figure only represents a small subset of outbreaks, but it indicates a real threat to pets. Numerous studies and reports have found that because of their more active behavior, dogs are more susceptible to coming into contact with harmful algae by ingesting toxins while swimming or grooming, drinking infected water, or coming into contact with toxic algae mats. The exact number of affected pets is difficult to assess since the total number of cyanobacterial poisonings is underreported. However, we know the rate of pet mortality as a result of HABs has significantly increased over recent years, probably in conjunction with increased runoff from agricultural or urban sources. Unfortunately, no federal agencies require regular testing of bodies of water for cyanobacteria, and state and local testing is very limited. As a result, pets are usually the first to discover harmful algal blooms.

This problem is likely to worsen in coming years. HAB events are projected to increase over time due to climate change and other environmental concerns, as well as population growth. Another serious risk to humans and animals is the ability of algae blooms to serve as vectors for other serious diseases, such as avian botulism, from which tens of thousands of fish and birds in the Great Lakes have perished since 1999, or malaria, to name a few.

The HSUS implores the Council to think about pet safety and wildlife conservation, and to recommend action by EPA to improve practices now in order to curtail future HAB poisonings. We would especially like to see efforts to increase public awareness, including signage at water bodies with a history of HABs to warn pet owners, to collaborate with veterinary hospitals to report incidents of cyanobacterial poisoning, and institute routine water testing. Thank you for your consideration.

Randy A. Moore: Mr. Moore thanked Ms. Tiaga for her presentation and noted that she mentioned one of the ways to support the Humane Society would be some form of signage. He asked to what extent she had considered the magnitude to which that can be done.

Jacqueline Tiaga: Ms. Tiaga replied that this was a new idea and it would be part of an overall public awareness/educational campaign. She added that she believed working with states/municipalities to post warning and hazards signs would do a lot for prevention.

Peter Grevatt: Dr. Grevatt asked to what extent Mr. Tiaga thought pet owners could be helpful in identifying areas that are experiencing algal blooms. One thing EPA has been talking more about is citizens, and taking advantage of the public that could report situations.

Jacqueline Tiaga: Ms. Tiaga replied that they had explored this idea and they have considered a hotline/call-in a tip line. She explained if a pet comes into contact they are encouraged to go to the Vet to have the pet checked out. The Vet could be a great resource in that they have the sense and knowledge and could help report those incidences.

Max Zarate-Bermudez: Dr. Zarate-Bermudez thanked Ms. Tiaga for coming and explained that he works for the CDC and that he knows that in England one of the first times they realized they had issues related to cyanobacteria was because of the death of some pets that drank water from reservoirs. He added that he sees that they are a young group of people from the Humane Society and thinks it’s great that they are expressing the importance of this issue and encouraged them to continue their work.

Brian Bennon, Tribal Water Systems Program Manager, Inter Tribal Council of Arizona

Brian Bennon: Mr. Bennon stated I am Brian Bennon, Hydrologist and Tribal Water Systems Program Manager at ITCA and I am here to convey the concerns documented in these three handouts:

- Resolution #ANC-14-052 of National Congress of American Indians (NCAI).
- Letter from Region 9 Tribal Operations Committee (RTOC).
- Resolution of 21 Member Tribes of the Inter Tribal Council of Arizona (ITCA).

566 Federally Recognized Tribes—"Indian Country"

- Where the median household income is 31% less than that of the nation ($35K/51K).
- Indian Country has the highest poverty rate in the nation (29%).
- There are 828 Public Water Systems in Indian Country, 91% classified as Small and Very Small.
- In EPA Region 9:
  - ½ of Indian Country land mass is in states of AZ, CA, and NV.
  - 39% of Indian Country PWSs serve population of 463,000.
  - Some tribes in AZ have unemployment rates of 50-70%.
- These are not just the same issues as faced by rural communities.
- The Federal Government and Tribes have unique Gov-to-Gov relationship based on treaties and subsequent formation of reservations.
- Well-established water rights case law.
- Indian Reservations created with inherent Federal Trust Responsibility to ensure sufficient water to support livelihoods of its residents.
- We take position that this includes access to safe drinking water.
- 12% of homes in Indian Country lack access to safe water and basic sanitation.
- U.S. commitment made to the United Nations Millennium Goal will not likely be met.
- Not just quantity, but a water quality issue as well.
- Compliance with SDWA continues to be a problem in Indian Country.
- Again, 91% of PWSs in Indian Country are classified as small or very small systems.
- The Infrastructure Task Force (ITF) identified contributing factors: lack of Technical, Managerial, or financial capacity, as well as utility governance.
- Tribal Water Systems (TWS) Program—31 years old.
- Provides Technical Assistance, Training, Tribal Operator Certification (EPA approved).
- National Tribal Drinking Water Operator Certification Program.
- TWS is "For Tribes & By Tribes", with direct Tribal Oversight (boards, working groups).
- The TWS goal is to remove barriers that inhibit tribal members in becoming certified operators or inhibit sustainable operations and maintenance of tribal water utilities.
- TWS annually empowers 600 tribal personnel, and more than 3,000 tribal operator certifications earned since 1983.
- Annual budget of $800,000.
- The importance of jurisdictionally-correct operator certification.
- State certification programs do not meet needs of Indian Country.
- States enjoy using portion of the State Revolving Fund (SRF) for non-construction of infrastructure: operator capacity building and program implementation (e.g., operator certification programs).
- With that flexibility, states can use the SRF to strike a balance between infrastructure construction and long-term protection of the infrastructure investments.
- The Tribal Set-Aside Program is supposed to be the tribal counterpart to the SRF.
- EPA interpretation of the SDWA: the Tribal Set-Aside is restricted only to infrastructure construction.
- No capacity building; cannot be used for training or Tribal Operator Certification Program.
- Very few federal funding opportunities for tribally-led organizations to provide tribal workforce capacity building.

- Two recent EPA funding cycles for TAT, $14M each, Tribal organizations received only $100K.
- 31 years of funding by U.S. DHHS five-year block grant program is ending; No request for appropriations—OMB says EPA has the funding.
- We ask for:
  1. Funding parity for workforce capacity building, increase in Tribal Set-Aside with set-aside for non-construction uses (e.g., training and tribal operator certification).
  2. EPA funding for technical assistance and training (TAT) to include tribal set-aside for Tribally-led organizations (for tribes, by tribes).
  3. Do not diminish funding of other tribal programs in order to implement numbers 1 and 2 above.

Caryn Mandelbaum, Esq.: Ms. Mandelbaum, asked Dr. Grevatt what kind of authority the Council has to ask the Administration to increase funding for set asides for Tribal or any disadvantage populations.

Peter Grevatt: Dr. Grevatt replied it is something the Agency can do.

James McCauley: Mr. McCauley noted he has a good understanding of how important it is to have the ability to certify your operators etc. in order to deliver clean healthy water. Water is life and good dependable people are needed to deliver that source to the customer. He added that they would like to see better training programs created for Indian country and asked how they can get IHS to work better with tribes without violating self-governance of the tribes.

Peter Grevatt: Dr. Grevatt noted that they have often talked about how difficult it is to keep trained operators at systems, once an operator becomes trained there may be better opportunities out there for them that become more lucrative. He then asked Mr. Bennon if he had any thoughts on how to address the issue.

Brian Bennon: Mr. Bennon replied that non-members in those positions have high turnover rates, unlike community members that want to go down this path who stay with it because it's so meaningful. But it's finding those community members that want to go down this career path and providing them with those opportunities.

Peter Grevatt: Dr. Grevatt asked if he had suggestions on how to approach that.

Brian Bennon: Mr. Bennon replied there is a parody with what states are getting for capacity development. He explained they have a program that has been very successful and yet now without funding they are falling down the crack and it may go away.

James McCauley: Mr. McCauley added that they have to find a mechanism to reach people in the system, noting with non-Indian operators it primarily comes down to pay, benefits, and location. He noted it comes down to how you get them certified and keep them viable.

Max Zarate-Bermudez: Dr. Zarate-Bermudez thanked and noted that one of the slides shown called for increasing access by Tribal communities by fifty percent and noted that based on the data presented it seems they won't reach that target.

Brian Bennon: Mr. Bennon replied those numbers come from the infrastructure task force. These are their numbers; they are focusing on just new capacity issues. The time frame was a little quick as well. Fifteen years to turn something around that has been years in the making is quick.

Robert (Bob) G. Vincent: Mr. Vincent asked if they had any U.S. Public Health Service staff that assisted them.

Brian Bennon: Mr. Bennon replied yes it was the Phoenix area IHS that helped them begin and provided a lot of support (not financial). They just wished they had more ability to help out with the OMB issue.

William Alley, Ph. D.: Dr. Alley noted the graph highlighted safe water and basic sanitation and asked for how that broke down between these two issues.

Brian Bennon: Mr. Bennon replied he wished he knew, but this is their data and he has been asking the same thing.

Wilmer Melton, III: Mr. Melton commented in North Carolina he knows that the reservations get a significant amount of support from water agencies through technical and SRF funding for the projects that they have. He added that Mr. Bennon can hopefully utilize this information since it is an already funded program that is in place. He noted that in North Carolina they have worked really hard to help communities understand succession plans and corresponding career opportunities by helping them understand why these jobs are so important. He explained that they take those programs into the school to teach children what they do as system operators. By doing so they help communities understand the importance of all that they do at the systems which helps those individuals you are losing want to stay.

Jill Jonas: Ms. Jonas stated this closed the public comment period.

COUNCIL DELIBERATIONS AND AGENDA TOPICS FOR NEXT MEETING

Peter Grevatt: Dr. Grevatt noted he wanted to add to and clarify some of the comments he said earlier about the future of NDWAC stating that he thinks the ones he stated are all very important. Most prominent, for the next meeting is the discussion on the Lead and Copper Rule long-term provisions and HABS. He added that the perchlorate peer review process would be right around the next meeting. Dr. Grevatt commented that he does believe those are very substantive discussions that are going to occur. It may be that they add some additional items to the agenda but from his perspective those will make up a large part of the agenda. In terms of timing, they will have to look at what makes the most sense and will be garnered largely on where they are with Lead and Copper. He is open to the possibility of having the meeting next year in some location other than Washington if that is going to be helpful.

Jill Jonas: Ms. Jonas noted that they were open to any suggestions regarding the next meeting/thoughts/or anything related to process that members would like to have considered.

Carrie M. Lewis: Ms. Lewis added that she completely agreed with Dr. Grevatt and stated that the Council is going to have their work cut out for them. She then commented that she assumes as they decide on a possible date they will let the Council know. She added that she was very grateful to Mr. Simon for burying them in homework before the meeting because it was very helpful and requested that the same be done for the next meeting as well.

Robert (Bob) G. Vincent: Mr. Vincent stated that he has used the EPA's water contamination assessment tool and if anyone hasn't they should look into it because it is a helpful tool. He added that he would encourage EPA update NDWAC on how that works.

Mae C. Wu: Ms. Wu added that one of the things she was thinking about was that they should maybe consider doing a webinar or conference call prior to the in-person meeting so there is more conversation among the Council Members when we are face-to-face. This may make the meetings more meaningful.

Peter Grevatt: Dr. Grevatt replied that he suspects they might want to take advantage of that on the Lead and Copper Rule.

Eric Burneson: Mr. Burneson commented that this has been the model for the last four meetings of the Lead and Copper Working Group: webinar first and then face-to-face focused on the discussion.

Peter Grevatt: Dr. Grevatt replied they can work with that.

Randy A. Moore: Mr. Moore noted that as a new member, a little more information about the protocol would be helpful. He explained that he thought they had two very valuable presentations on public comment and wondered how they consider meeting on these issues.

Peter Grevatt: Dr. Grevatt replied the NDWAC always has the ability to make recommendations to the Administrator about the things they hear during the meeting. To the extent that they are recommendations, they want to make sure the Council can definitely take those to the Administrator.

Carrie M. Lewis: Ms. Lewis asked if they would put those two items on the agenda for the next meeting.

Peter Grevatt: Dr. Grevatt replied that is something they could do, if they feel these are items they want to explore more fully, but they already have an item on HABS so they could work that piece into the Council's recommendations to the Administrator. In regards to the tribal funding issue, he added if they wanted to add that to the agenda they could consider that.

Jill Jonas: Ms. Jonas asked if people were comfortable including the statement of the Humane Society to what the smaller group addresses and brings back to NDWAC, and are people interested in placing the tribal issues on the agenda for the next meeting.

Peter Grevatt: Dr. Grevatt replied he would invite members to think a little bit more about the agenda items you would like to be added and get back to the group.

Jill Jonas: Ms. Jonas thanked Dr. Grevatt for clarifying that and noted she assumed they would be working with Ms. Schutz on specific agenda items. She then asked if there were any more questions. Ms. Jonas concluded by thanking Dr. Grevatt and all of the Office of Ground Water and Drinking Water staff for their time, the presenters, other federal representatives, members of public and NDWAC members. She thanked everyone for their commitment and time, and for the opportunity for her to be a part of all of it.

Jeanne-Marie Bruno: Ms. Bruno thanked Ms. Jonas for being their Chair.

Peter Grevatt: Dr. Grevatt wished everyone safe travels and farewell, and noted he was looking forward to working with everyone moving forward. For those rolling off, he encouraged them to stay in touch.

Respectfully Submitted:
/Signed/

Roy Simon
DFO
2/5/15

Respectfully Submitted:
/Signed/

Jill D. Jonas
Chair
2/4/15

Appendix I: Agenda

Final AGENDA - November 6, 2014

National Drinking Water Advisory Council Meeting
EPA William Jefferson Clinton East Building – Room 1117 A
November 6 and 7, 2014

DAY 1: Thursday – November 6, 2014		
8:00- 8:30 AM	**Registration and Coffee for Members**	
8:30 - 9:00	**Welcome and Review Agenda**	Jill Jonas, NDWAC Chair Peter Grevatt, Office Director, EPA Office of Ground Water and Drinking Water (OGWDW)
9:00 – 9:30	**National Drinking Water Program Update** *Purpose: Provide an overview of the National Drinking Water Program Priorities for the year ahead and discussion.*	Peter Grevatt
9:30 - 10:30	**Drinking Water Regulatory Development Activities** *Purpose: Update on drinking water regulatory-related activities and discussion focused on the upcoming Six year review of drinking water regulations including update on Lead and Copper Working Group*	Eric Burneson, Director, Standards and Risk Management Division, OGWDW
10:30 -- 10:45	**Break**	
10:45 – 12:00 pm	**Consultation on Drinking Water Treatment Compliance Flexibility – issues relevant to the Long Term 2 Enhanced Surface Water Treatment Rule** *Purpose: Presentation and Consultation with the NDWAC*	Jill Jonas: Facilitator Eric Burneson – Introduction

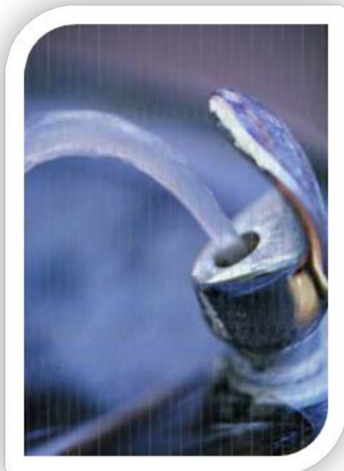
		Ken Rotert Standards and Risk Management Division, OGWDW Mike Finn Drinking Water Protection Division, OGWDW Carol DeMarco King and Joyce Chandler, Office of Enforcement and Compliance Assurance
12:00-1:30	**Lunch on your own**	
1:30 – 2:30	**Consultation on Drinking Water Treatment Compliance Flexibility – issues relevant to the Long Term 2 Enhanced Surface Water Treatment Rule** *Purpose: Consultation Continued*	Jill Jonas: Facilitator Eric Burneson and Ron Bergman, Acting Director Drinking Water Protection Division, OGWDW
2:30 - 3:30	**Consultation on Methods for Setting Standards for Groups of Carcinogenic Volatile Organic Chemicals.** *<u>Purpose:</u> To discuss the optional risk-based methods for setting drinking water standards for groups of chemicals.*	Jill Jonas: Facilitator Lisa Christ, Chief of Targeting and Analysis Branch, Standards and Risk Management Division
3:30 – 4:00	**Break**	
4:00 – 5:00	**Title: Update on Climate-Ready Utilities** *<u>Purpose:</u> To discuss the actions taken since NDWAC 2011 Report to the Administrator. Also discuss of Agency's climate portfolio including resiliency and sustainability.*	Jill Jonas: Facilitator David Travers, Director Water Security Decision Office of Ground Water and Drinking Water

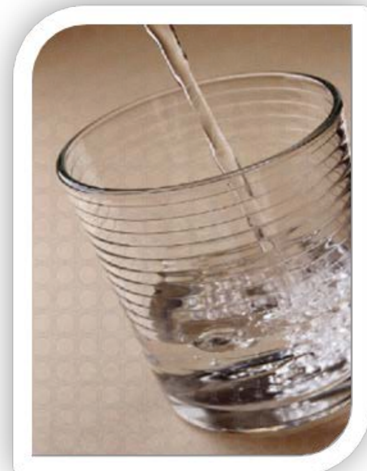
5:00 – 5:30	**Title: Introduction to Potable Reuse** *Purpose:* *Overview of Office of Water Activities*	Michelle Schutz, Senior Advisor on Reuse
5:30 – 6:30	**Walk to Restaurant for Dinner**	
6:30 PM – 8:30 PM	**Group Dinner at:** **The Hamilton – 14th and F Streets , NW** **And then Taxi, Metro or walk back to Hotels.**	Roy Simon, Facilitator

DAY 2: Friday – November 7, 2014		
8:00- 8:30 A.M.	**Coffee for Members**	
8:30-10:00	**Title: Update on activities to reduce nutrients and address algal blooms and algal toxins** Purpose: *Describe and Discuss EPA Activities* o *Introduction and Events in Toledo, OH* o *Update on cyanotoxin fact sheet, analytical methods, UCMR4 and CCL* o *OW Office of Science and Technology planned actions for Health Advisories for cyanotoxins* o *EPA Nutrient Reduction Actions and Opportunities for Source Water Protection.* ***Key Question for Discussion:*** *Are EPA* activities to reduce nutrients and address Algal Blooms and Algal Toxins the activities that EPA should be implementing?	Jill Jonas, Facilitator Peter Grevatt Eric Burneson Lesley D'Anglada, Dr.P.H. Microbiologist, Health and Ecological Division, Office of Science and Technology (OST), OW Tom Wall, Director Assessment and Watershed Protection Division Office of Wetlands, Oceans and Watersheds Peter Grevatt
10:00 – 10:30	**Break**	
10:30 – 11:30	**Title: Update on activities to reduce nutrients and address Algal Blooms and Algal Toxins** Purpose: *Continue discussion on the key question.*	Facilitators: Jill Jonas and Peter Grevatt

11:30 – Noon	***Title: Pres*****entations for Terms of Service and Possible Future Issues for Council's next meeting**	Peter Grevatt, OD/OGWDW
12:00-1:00 P.M.	**Lunch on your own**	
1:00- 1:30	**Public Comments**	Jill Jonas and Roy Simon, DFO Facilitators
1:30 – 2:00	**Council Deliberations and Agenda Topics for Next Meeting**	Jill Jonas and Peter Grevatt as Co-facilitators
2:00-2:30	**Closing Remarks and Adjourn**	Jill Jonas Peter Grevatt Roy Simon

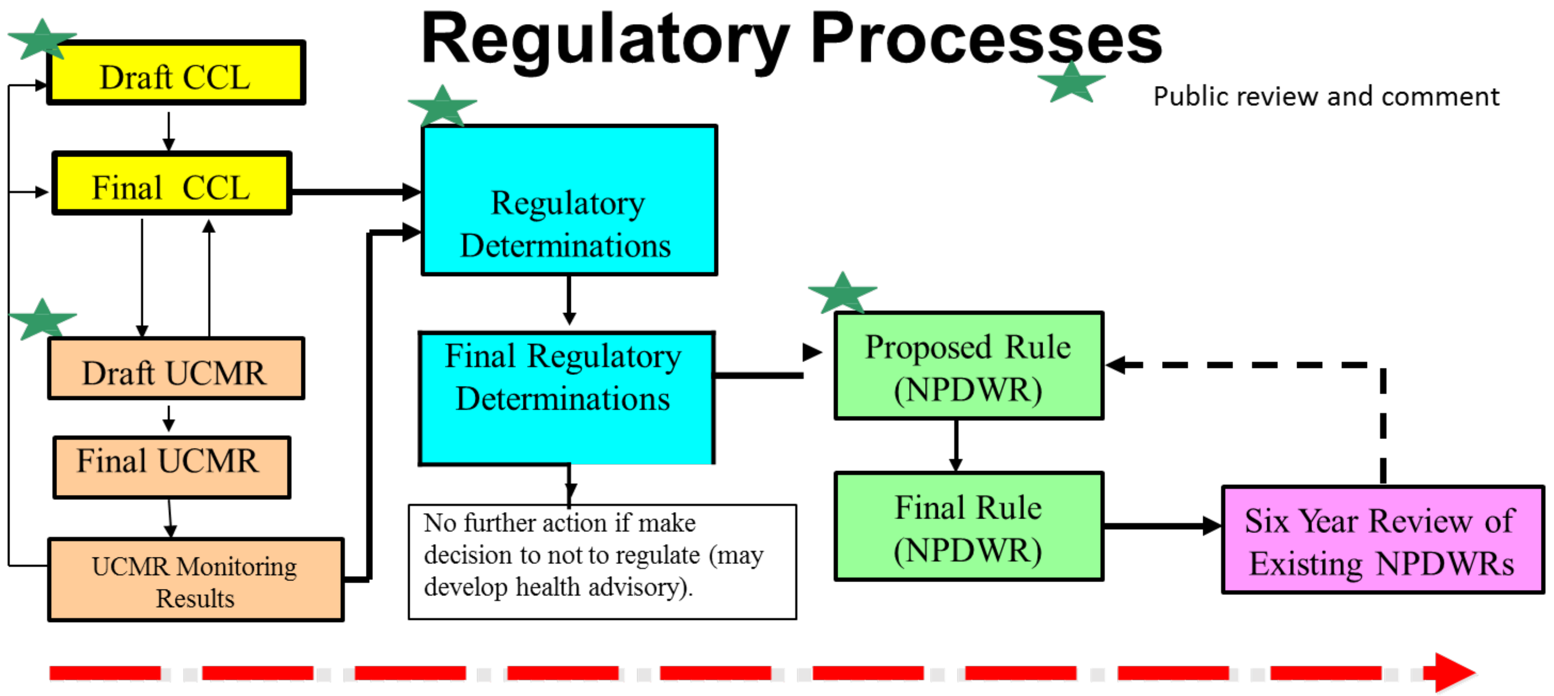
Drinking Water Regulatory Development Activities





Presenter: Eric Burneson, Director
Standards and Risk Management
Division Office of Ground Water and
Drinking Water Office of Water, US EPA

General Flow of Safe Drinking Water Act



At each stage, need increased specificity and confidence in the type of supporting data used (e.g. health, occurrence, treatment).

CCL = Contaminant Candidate List
UCMR = Unregulated Contaminant Monitoring Rule
NPDWR = National Primary Drinking Water Rule

Presentation Overview

- Contaminant Candidate List
- Regulatory Determinations
- Unregulated Contaminant Monitoring
- Rules Under Development/Revision
- Six Year Review of Regulations

Contaminant Candidate List (CCL)

- Published Third Contaminant Candidate List (CCL 3) in October 2009, which listed 116 contaminants:
  - 12 microbes (e.g., viruses, bacteria)
  - 104 chemicals (pesticides, industrial chemicals, pharmaceuticals, inorganics)
- Spring 2012 - Published FR notice requesting nominations of contaminants to be considered for inclusion on CCL 4
  - 59 unique contaminants were nominated by 10 organizations and individuals
    - 5 microbes and 54 chemicals
    - 8 contaminants were nominated more than once
  - The nomination letters and web site submittals can be found in the CCL 4 docket (EPA-HQ-OW-2012-0217) at www.regulations.gov
- Expect Draft CCL 4 publication in 2014

Regulatory Determinations

SDWA requires EPA to make regulatory determinations for at least 5 CCL contaminants every 5 years. EPA must regulate if:

1) *The contaminant may have an adverse effect on the health of persons;*
2) *The contaminant is known to occur or there is substantial likelihood that the contaminant will occur in public water systems with a frequency and at levels of public health concern; and*
3) *In the sole judgment of the Administrator, regulation of such contaminant presents a meaningful opportunity for health risk reduction for persons served by public water systems*

SDWA Section 1412(b)(1)

Regulatory Determination Outcomes

- **No Regulatory Determination**
  - Insufficient data to assess contaminant on three criteria
- **Positive Determination**
  - Affirmative determination for all three criteria
  - Begin process to develop a drinking water regulation
  - Not considered a final agency action
- **Negative Determination**
  - Negative determination for any one of the three criteria
  - Considered a final agency action
  - Drinking water regulation is not developed
  - Health Advisory is a non-regulatory option

#	Outcome
1	✓
2	✓
3	✓

#	Outcome
1	✓
2	X
3	X

Regulatory Determination – Strontium

	Background→ Statutory Criteria ↓	**Strontium:** Primarily from naturally occurring inorganic compounds that are widely present in soils. Also used in fertilizers and pyrotechnics.
1	Adverse Effect? **Yes**	• Health endpoint = decreased bone calcification, which could lead to fractures and osteoporosis; 0-18 year olds are more sensitive since bones still developing • Health Reference Level (HRL) – 1500 µg/L (based on sensitive life stage)
2	Known or likely to occur? **Yes**	• Found in 7% of 989 water systems greater than HRL (older national survey of ground water systems) • USGS found > HRL in 12% of ground water systems • Preliminary UCMR 3 data* - 100% of 1,858 systems have detected at levels ≥ reporting level (0.3 µg/L) and ~5% of systems (ground and surface water) have found at health levels of concern
3	Meaningful opportunity? **Yes**	• 11% of population exposed for systems with detects greater than HRL in the ground water survey • National extrapolation of NIRS for ground water population ~10 M • Sensitive populations include growing children [especially those with low dietary calcium and Vitamin D, people with renal problems, and Padget's disease (a bone condition – mostly impacts elderly)]

Note: Currently collecting surface and ground water occurrence data as part of UCMR 3 (2013-2015). The first 18 months of data (half) will be available for making the final determination. All of the UCMR 3 data will be available for the proposed and final rulemakings.

Regulatory Determination – 1,3-Dinitrobenzene, Dimethoate, Terbufos & Terbufos Sulfone

	Background→ Statutory Criteria ↓	**1,3-Dinitrobenzene:** Used as industrial chemical and in the production of other substances.	**Dimethoate:** Organophosphate pesticide used on field crops.	**Terbufos & Terbufos Sulfone:** Organophosphate pesticide, primarily used on corn and beets.
1	Adverse Effect? **Yes for all**	• Increased spleen weight	• Cholinesterase enzyme (ChE) inhibition	• Cholinesterase (ChE) enzyme inhibition
2	Known or likely to occur? **No for all**	• No to very low occurrence in public water systems at health levels of concern based on national surveys		
3	Meaningful opportunity? **No for all**	• No sensitive populations of concern with the exception of 1,3-Dinitrobenzene (individuals w/ blood disorders & sperm complications) • Because no/very low national occurrence at health levels of concern in drinking water, expect no/very low population exposure		

Status and Next Steps for Regulatory Determinations 3 (RD3)

- Preliminary RD3 Federal Register Notice - published October 20, 2014
  - 60 day public comment period
- Hold stakeholder meeting and solicit public input during the 60-day comment period.
- Publish final regulatory determination ~December 2015.
- If the agency makes a final determination to regulate strontium, then:
  - Proposed regulation 24 months after final regulatory determination notice.
  - Promulgate final regulation 18 months after proposal.

Unregulated Contaminant Monitoring Rule ("UCMR 3")

- Final rule published May 2, 2012
  - *http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/ucmr3/index.cfm*
- Monitoring taking place January 2013 – December 2015; reporting through ~mid-2016
- 28 chemicals and 2 viruses
- Chemical contaminants include hormones, perfluorinated compounds (e.g., PFOS/PFOA), VOCs, metals (including Cr-6 and total Cr), 1,4- dioxane, chlorate

UCMR 3 Preliminary Results

- Results updated and posted quarterly
  - http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/data.cfm
  - Currently reflects reported data as of July 1, 2014
  - November 2014 update will reflect data as of October 1, 2014
- UCMR 3 minimum reporting levels (MRLs) are based on analytical method quantitation limits
  - comparably lower than UCMR 1 and UCMR 2 MRLs;
  - more frequent detection of UCMR 3 contaminants expected

UCMR 4 Regulatory Development

- Development of rule for the next cycle of monitoring initiated early 2014
- Public meeting/webinar held May 2014 to discuss potential UCMR 4 contaminants
- Anticipate publishing proposed rule mid-2015 and inviting public comment
- Anticipate publishing final rule late 2016
- Implementation preparation by EPA, States, PWSs, and labs would take place through 2017
- Anticipate starting monitoring January 2018

Other Rules Under Development: Perchlorate

- EPA is developing a proposed perchlorate standard:
  - Continue to evaluate available data on perchlorate occurrence
  - Evaluating the feasibility of treatment technologies to remove perchlorate and examine the costs and benefits of potential standards
- Science Advisory Board Recommendations for methodologies to derive a Maximum Contaminant Level Goal (MCLG) May 29, 2013
  - Develop a perchlorate MCLG using Physiologically Based Pharmacokinetic (or "PBPK") modeling rather than the traditional approach of using the reference dose and exposure factors.
- EPA is working with FDA scientists to evaluate options for PBPK modeling to derive a perchlorate MCLG

Other Rules Under Development: Carcinogenic VOCs Group

- EPA is developing a proposed group cVOC standard
  - Considering regulated (TCE, PCE and others) and unregulated carcinogenic VOCs (cVOCs)
  - Assess potential cVOCs for the group based upon similar health effect endpoints; common analytical method(s); common treatment or control processes; and occurrence/co-occurrence in drinking water
  - Occurrence data is being collected for 3 unregulated cVOCs currently under UCMR 3
  - Consulting today on options for group MCLs

Six Year Review

- EPA must review and, if appropriate, revise existing NPDWR every six years
  - In 2003, EPA completed the 1st Six Year Review of 69 NPDWRs; made decision to revise 1989 Total Coliform Rule
  - In 2010, EPA completed the 2nd Six Year Review of 71 NPDWRs and identified tetrachloroethylene (PCE), trichloroethylene (TCE), acrylamide and epichlorohydrin as candidates for revision.
  - Expect to complete 3rd Six Year Review by 2016
    - 46 states and 8 primacy agencies have supplied EPA with their compliance monitoring data
    - We are continuing our review of the data and are working directly with the states and primacy agencies to resolve any data questions

Six-Year Review Protocol – Key Elements

- Rules with revisions underway or recently promulgated
- Health effects evaluation
- MCLs and treatment techniques
- Analytical methods
- Treatment evaluation
- Occurrence analysis
- Implementation issues

Six Year Review – Current Activities

- This is the first time EPA is reviewing the entire suite of Microbial and Disinfection Byproducts (MDBP) Rules
- Chemical and radiological rules also are currently undergoing review
- We plan to retain the same key elements as were used for SYR1 and SYR2
    - Minor clarifications are being made to the protocol where necessary to better reflect the third Six Year Review (SYR3) review process for MDBP Rules.

MDBP Rules Undergoing Six Year Review

- Surface Water Treatment Rules (SWTR, IESWTR, LT1, LT2) – addresses microbial contaminants in SW systems; includes NPDWRs for *Giardia*, Viruses, *Legionella*, Coliforms, *Cryptosporidium*, Heterotrophic Plate Count, and Turbidity
- Ground Water Rule – addresses microbial contaminants in GW systems; includes NPDWR for Viruses
- Disinfectants/Disinfection Byproducts Rules – addresses disinfectants and disinfection byproducts; includes NPDWRs for TTHM, HAA5, Bromate, Chlorite, and Disinfectants (Chlorine, Chloramine, and Chlorine Dioxide)
- Filter Backwash Recycling Rule

Review of Long Term 2 Enhanced Surface Water Treatment (LT2) Rule

- 2011 - EPA announced plans to initiate the review of LT2 in response to executive Order 13563 (Improving Regulation and Regulatory Review).
- Have held three stakeholder meetings to solicit/gather information on the Round 1 monitoring results/bin placement, analytical methods improvements, uncovered finished reservoirs, and microbial toolbox options.

Storage Inspection and Cleaning

- In the 2010 proposed revisions to the Total Coliform Rule, EPA requested comment on “the value and cost of periodic storage facility inspection and cleaning”.
  - Many commenters suggested cleaning and inspection requirements citing outbreaks (i.e. Alamosa, CO 2008) and conditions found in some tanks.
  - Other commenters stated that sanitary survey requirements are adequate and information collection should continue.
- On October 15, 2014, EPA held a public meeting and webinar to gather more information and exchange ideas on how best to assure drinking water quality is not degraded in storage facilities.

Lead and Copper Rule, Long-term Revisions

National Drinking Water Advisory Council Working Group Consultation Process

EPA's Goal for the Long-term Revisions:

Improve the effectiveness of corrosion control treatment in reducing exposure to lead and copper and to trigger additional actions that equitably reduce the public's exposure to lead and copper when corrosion control treatment alone is not effective.

Why did EPA Form a Working Group?

In 2011, EPA consulted with the NDWAC on key areas of LCR rule revisions

Since 2011, EPA has further analyzed those key areas and is seeking greater, in depth, stakeholder input

To facilitate this input, EPA helped to form a Working Group under the auspices of the NDWAC to provide input and recommendations

Working Group Composition

Working Group members were selected based on the experience needed to provide balanced advice on the five issues related to Long-term revisions to the LCR

Members of the NDWAC have been selected for workgroup participation in order to facilitate the flow of information between the work group and NDWAC

NDWAC Working Group Process

The Working Group is exploring five specific technical issues and will:

- provide suggestions on how to implement the goals for LCR revisions provide information
- share perspectives on advantages and disadvantages of options under consideration by EPA, and
- suggest additional options

Working Group: Report to the NDWAC (consensus where possible, with minority reports where no consensus), which in turn will provide recommendations on these issues to EPA

Key Issues for Input

The five key areas of the LCR for revision which would benefit from stakeholder input are as follows:

- Measures to ensure optimal corrosion control treatment
- Sample site selection criteria for lead and copper
- Lead sampling protocol
- Public education for copper
- Lead Service Line Replacement (LSLR)

Challenges

- What is optimal corrosion control and what water quality factors influence its effectiveness?
- The goals of site selection and sampling protocol
  - System-wide regulatory compliance vs. risk identification and mitigation at the household/facility level.
  - How to increase the probability of identifying areas of higher risk
  - Differences in sampling for lead vs. copper risk
- Remedy selection
  - Lead Service Line Replacement (LSLR)
  - Cost
  - Feasibility
  - Certainty of effectiveness of the remedy
- Community education
  - Interpretation of monitoring results to inform public education efforts
  - Dissemination and effectiveness of health risk information and protection strategy messaging to consumers

Draft NDWAC Consultation Timeline

NDWAC Lead and Copper Working Group, meetings and summaries:

http://water.epa.gov/lawsregs/rulesregs/sdwa/lcr/lead_review.cfm

Fact Sheet: Preliminary Regulatory Determinations for the Third Drinking Water Contaminant Candidate List (CCL 3)

The EPA has drinking water regulations for more than 90 contaminants. To assess and address risks posed by unregulated contaminants, the EPA, in accordance with the Safe Drinking Water Act (SDWA), identifies a list of contaminants which may require regulation in the future. Every five years, the EPA determines whether we should regulate at least five contaminants in drinking water with a national primary drinking water regulation (NPDWR).

In October 2009, the EPA published the third Drinking Water Contaminant Candidate List (CCL3). After extensive review of health effects and occurrence data, on October 20, 2014, the agency announced its preliminary regulatory determinations for five contaminants listed on CCL3. The EPA is making preliminary determinations to regulate strontium in drinking water and to not regulate four contaminants (i.e., dimethoate, 1,3-dinitrobenzene, terbufos and terbufos sulfone). The EPA is requesting comment on these preliminary determinations in the 60-day period following publication of the notice in the *Federal Register*. During the comment period, the EPA expects to hold a stakeholder meeting to discuss and solicit input on the preliminary determinations. The EPA will evaluate public comments prior to making the final regulatory determinations in 2015.

Questions and Answers

What is the drinking water CCL?

The drinking water CCL is the primary source of priority contaminants for making decisions about whether drinking water regulations are needed. The contaminants on the list are known or anticipated to occur in public water systems. However, they are currently unregulated by existing NPDWRs.

How often is the CCL published?

The Safe Drinking Water Act (SDWA) directs the EPA to publish a CCL every five years. The EPA published the first CCL (CCL1) of 60 contaminants in March 1998. The agency published the second CCL (CCL2) of 51 contaminants in February 2005. The EPA then published the third CCL (CCL3) of 116 contaminants in October 2009. The CCL 3 includes 104 chemicals or chemical groups and 12 microbiological contaminants. You can find a list of these 116 contaminants at the following the EPA website: http://water.epa.gov/scitech/drinkingwater/dws/ccl/ccl3.cfm.

Office of Water (4607M) 815–F-14-001 October 2014

What is a regulatory determination?

A regulatory determination is a formal decision on whether the EPA should initiate a rulemaking process to develop a national primary drinking water regulation for a specific contaminant. The law requires that we make regulatory determinations for at least five contaminants from the most recent CCL every five years.

What criteria does the EPA consider in making regulatory determinations?

When making a determination to regulate, SDWA requires that the EPA consider three criteria:

- the potential adverse effects of the contaminant on the health of humans,
- the extent of contaminant occurrence (or likely occurrence) in public drinking water, and
- in the sole judgment of the Administrator, whether regulation of the contaminant presents a meaningful opportunity for reducing health risks for persons served by public water systems.

If the EPA determines that all three of these statutory criteria are met and makes a final determination to regulate a contaminant, the agency has 24 months to publish a proposed Maximum Contaminant Level Goal (MCLG) and NPDWR. After the proposal, the agency has 18 months to publish a final MCLG and promulgate a final NPDWR, but may extend this deadline by up to 9 months if needed. If the answer to any of the three statutory criteria is negative based on the available data, then the agency makes a determination that an NPDWR is not necessary for that contaminant at that time. If the EPA has insufficient information/data to evaluate a contaminant according to the statutory criteria, it will not make a decision until such data become available.

What are the preliminary regulatory determinations for CCL3?

The EPA announced preliminary regulatory determinations for five contaminants listed on CCL3: dimethoate, 1,3-dinitrobenzene, strontium, terbufos, and terbufos sulfone. Based on a review of available health information, the agency has made the preliminary determination that strontium may have an adverse health effect in people without enough calcium in their diet because it replaces calcium in the bone during development. The EPA has also determined that strontium occurs frequently in public water systems. Therefore, the EPA is making a preliminary determination to regulate strontium so that the agency can further evaluate whether regulation of strontium in drinking water provides an opportunity for public health protection. The EPA has also made a preliminary determination that dimethoate, 1,3-dinitrobenzene, terbufos, and terbufos sulfone are not occurring, or occur infrequently, in drinking water. Therefore, the EPA's preliminary determination is that these contaminants do not require regulations for drinking water. After considering public comments, the EPA plans to make the final regulatory determinations in 2015.

What about nitrosamines and chlorate?

The agency is reviewing the existing microbial and disinfection byproduct (MDBP) regulations as part of the Six Year 3 (SY3). Because chlorate and nitrosamines are DBPs that can be introduced or formed in public water systems partly because of disinfection practices, the agency believes it is important to evaluate these unregulated DBPs in the context of the review of the existing DBP regulations. DBPs need to be evaluated collectively because the potential exists that the chemical disinfection used to control a specific DBP could affect the concentrations of other DBPs. Therefore, the agency is not making a regulatory determination for chlorate and nitrosamines at this time. The agency expects to complete the review of these DBPs by the end of 2015.

Does the EPA have to wait until the next regulatory determination cycle to decide whether to develop a drinking water standard for an unregulated contaminant?

It is important to note that the agency is not precluded from making a determination prior to the end of the next regulatory determination cycle and/or regulating a contaminant at any time when it is necessary to address an urgent threat to public health, including any contaminant not listed on the CCL.

Do these regulatory determinations impose any requirements on public water systems?

No. These regulatory determinations do not impose any requirements on public water systems at this time. Instead, this action notifies interested parties of the EPA's preliminary regulatory determinations for five unregulated contaminants and requests comment on this action.

Where can I find more information about this notice and the CCL 3 Regulatory Determinations?

For information on the regulatory determinations for CCL3, please visit the following website: http://water.epa.gov/scitech/drinkingwater/dws/ccl/ccl3.cfm.

For general information on drinking water, please visit the EPA's drinking water homepage at www.epa.gov/drink or contact the Safe Drinking Water Hotline at 1-800-426-4791. The Safe Drinking Water Hotline is open Monday through Friday, excluding legal holidays, from 10:00 a.m. to 4:00 p.m., Eastern time.

Inter Tribal Council of Arizona, Inc.
Presented by Brian Bennon, ITCA Tribal Water Systems Program Manager

Twelve percent of homes in Indian Country lack access to safe drinking water and adequate sanitation. Additional and sustained federal funding, in parity with existing funding to states, for tribally-led water-sector workforce capacity building is necessary for public health and economic viability.

To meaningfully address safe drinking water and sanitation needs in Indian Country is to protect appropriate infrastructure construction with sustained operations and maintenance capacity building (technical assistance, training, and professional certification). The few federal funding opportunities that exist for water-sector capacity building initiatives are short-term in nature and are geared towards large nation-wide corporations. As a result, very few tribally-led organizations have programs that provide water-sector capacity building services and the survival of those tribally-led programs are gravely threatened. Under the Safe Drinking Water Act, a portion of the State Revolving Fund is used by the states for capacity building (non-infrastructure construction). In contrast, the Tribal Set-Aside under the Safe Drinking Water Act is reserved only for infrastructure construction (no capacity building). Furthermore, jurisdictionally-appropriate licensing of tribal water/wastewater system operators is primarily an unfunded mandate. To protect public health and economic viability in Indian Country, a dedicated and sustained funding mechanism, which is non-discretionary and multi-year in nature, is needed for tribally-led capacity building initiatives. However, such funding must not diminish appropriations for infrastructure construction, but instead protect tax-payer infrastructure investments through sustainable operations and maintenance.

Long Term 2 Enhanced Surface Water Treatment Rule

Compliance Flexibility for Public Water Systems

Presenter: Ken Rotert and Mike Finn
Office of Ground Water and Drinking Water
Environmental Protection Agency

Outline

- Congressional Language
- Background
- Federal Advisory Committee Involvement
- Overview of LT2 Rule
- Implementation
- Microbial Toolbox
- Training and Technical Assistance by EPA/States
- Compliance Status
- SDWA: Public Water System Enforcement
- Discussion Questions

Congressional Language

Drinking Water Treatment Compliance Flexibility.

- The Committees recognize that the Long Term 2 Enhanced Water Treatment Rule presents significant costs and technical challenges for systems serving fewer than 100,000 persons while current time frames present significant challenges for communities seeking to annualize the capital investment.
- The Committees direct EPA and the States to work as partners with municipalities that are progressing in good faith to comply with the rule and need additional time to minimize volatility in water utility rates for ratepayers.
- The Committee directs EPA to convene a working group of Federal, State, and local stakeholders to discuss options for compliance schedules and report to the Committees within 180 days of enactment of this Act about interim options for ensuring protection of human health and the environment under the rule without the use of an enforcement action or an administrative order.

Source: (http://docs.house.gov/billsthisweek/20140113/113-HR3547- JSOM-G-I.pdf)

BACKGROUND

General Background

- 1989 – Surface Water Treatment Rule (Filtration, Disinfection, Turbidity, *Giardia lamblia*, viruses, *Legionella* and Heterotrophic Bacteria)
- 1992-93 – Regulatory negotiation process
- 1993 – Milwaukee outbreak - The most notable outbreak of cryptosporidiosis in U.S. history. (403,000 ill; at least 54 died)
- 1996 – Safe Drinking Water Act (SDWA) Amendments
- 1997 - Stage 1 Microbial/Disinfection Byproducts (M/DBP) Federal Advisory Committee Act (FAC) Agreement in Principle (AIP) signed

General Background (cont'd)

- 1998 – Interim Enhanced Surface Water Treatment Rule (IESWTR) - Applies to public water systems (PWSs) that use surface water or ground water under the direct influence of surface water (GWUDI) and serve ≥ 10,000 people
- 2000 - Stage 2 M/DBP FAC AIP signed
- 2002 – Long Term 1 Enhanced Surface Water Treatment Rule (LT1) - applies to all small PWSs (serving less than 10,000 people) that use surface water or GWUDI
- 2006 – Long Term 2 Enhanced Surface Water Treatment Rule (LT2) – Targets systems with elevated source water Crypto concentrations

Public Health Concerns

- Crypto is a pathogenic protozoan parasite primarily introduced to water via waterfowl and mammal feces
- Most human infections are caused by 2 of 12 Crypto species detected in humans (*C. hominis* and *C. parvum*)
- Crypto can cause gastrointestinal illness (e.g., diarrhea, vomiting, cramps)
  - Healthy people recover within several weeks, but illness may persist and lead to death in those with compromised immune systems (e.g., AIDS patients, the elderly)
  - Other sensitive subpopulations include young children and pregnant woman who may be more susceptible to dehydration resulting from diarrhea
- LT2 estimated more than 100,000 cryptosporidiosis cases per year were occurring subsequent to the IESWTR and LT1 requirements

Occurrence and Treatment

- Monitoring data from the 1990s found large differences in source water Crypto occurrence across different water sources
  - Some systems may not have been getting adequate treatment while implementing the IESWTR and LT1
- Crypto is resistant to most disinfectants except for ultraviolet light disinfection (UV)
  - UV especially cost effective (big help for unfiltered systems)
  - Other technologies available (e.g., membranes, enhanced filtration)

FEDERAL ADVISORY COMMITTEE INVOLVEMENT

Federal Advisory Committee/Agreement in Principle

- During the 1992-1993 regulatory negotiation process, stakeholders suggested a phased risk-risk tradeoff M/DBP strategy
- The IESWTR and LT1 built upon stakeholder agreements reached in 1993 but also reflected the recommendations from the 1997 Stage 1 M/DBP FAC Agreement in Principle
- During 1999 – 2000, Stage 2 M/DBP FAC developed recommendations for the Stage 2 DBP and LT2 rules
  - M-DBP FAC membership included EPA, States, environmental and public health advocates, drinking water utilities, chemical and equipment manufacturers
- EPA agreed to develop a proposed rulemaking that reflected the recommendations of the M/DBP FAC Agreement in Principle
  - EPA proposed LT2 in 2003, which reflected the recommendations

Federal Advisory Committee/Agreement in Principle "FLEXIBILITY FOR SYSTEMS"

- The Stage 2 M/DBP FAC recognized that systems may need to provide additional protection against Crypto, and that such decisions should be made on a system specific basis
- This approach involves assignment of systems into different categories (or bins) based on Crypto source water monitoring results.
- Additional treatment requirements depend on the bin to which the system is assigned.
  - Flexibility - Systems will choose technologies to comply with additional treatment requirements from a 'toolbox' of options

Federal Advisory Committee/Agreement in Principle

- Additional treatment requirements assume that conventional treatment plants in compliance with the IESWTR achieve an average of 3 logs removal of Crypto
- Meeting the requirements for each "Action Bin" may necessitate one or more management strategies which include watershed control, reducing influent Crypto concentrations, improved system performance, and additional treatment barriers

OVERVIEW OF LT2 RULE

Overview of LT2 Rule

- LT2 is a national primary drinking water regulation (NPDWR) that aims to reduce disease incidence associated with Crypto and other pathogenic microorganisms in drinking water

Drivers for LT2 development

- Some Crypto strains highly infectious
- Feasible to measure Crypto concentrations in source water
- Some systems have high source water Crypto concentrations
- Feasible to lower Crypto source concentrations

Overview of LT2 Rule

- Targeted approach supplements existing regulations (e.g., SWTR) to address Crypto in systems with higher risk
  - Filtered systems with high source water concentration must provide additional treatment
  - All unfiltered systems must provide at least 2-log inactivation (or 3-log depending on source water concentration)*
  - Systems must complete implementation of toolbox options no later than 3 years following bin placement
- LT2 also addresses concerns with uncovered finished water reservoirs (UCFWRs)

* Systems meeting Surface Water Treatment Rule criteria for avoiding filtration.

Source Water Monitoring Requirements

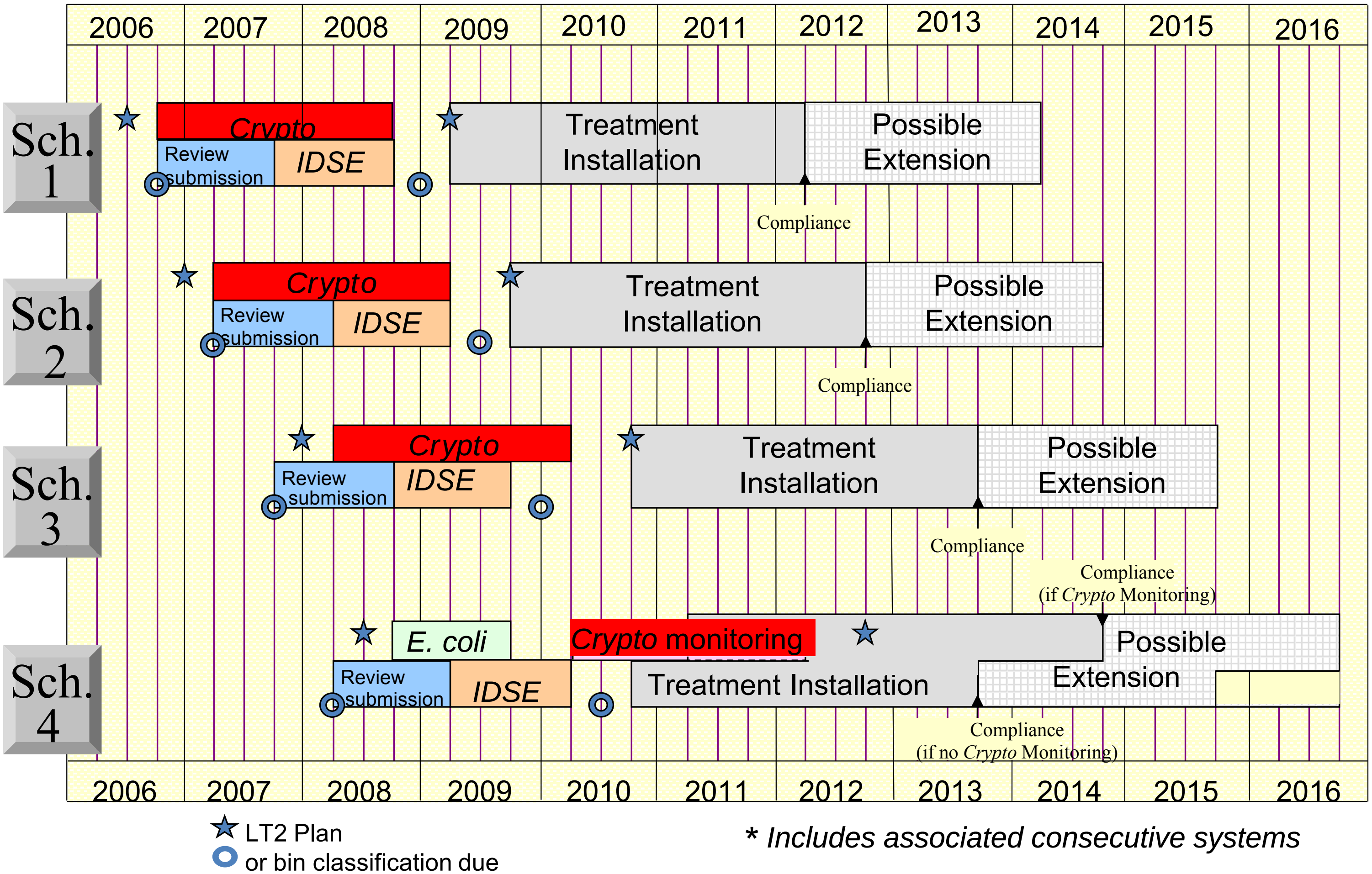
- Filtered Systems serving ≥ 10,000 people - Monthly sampling for Crypto, *E. coli*, and turbidity for 24 months
  - Second round of monitoring starts no later than April 2015 – October 2016, depending on system size
  - All unfiltered systems monitor for Crypto unless they provide at least 3-log Crypto inactivation
- Systems <10,000 People - *E. coli* monitoring biweekly for one year to determine need for Crypto monitoring
  - If *E. coli* above trigger value then conduct Crypto sampling (24 samples)
  - Second round of monitoring starts no later than October 2017 for *E. coli* and no later than April 2019 for Crypto

Bin Boundaries

- Bin 1 – Fewer than 0.075 oocysts/liter
  - No additional treatment needed
- Bin 2 – From 0.075 to fewer than 1.0 oocysts/liter–
- 1 – 1.5 log additional treatment depending on filtration in place
- Bin 3 – From 1.0 to fewer than 3.0 oocysts/liter
- 2 – 2.5 log additional treatment depending on filtration in place
- Bin 4 – 3.0 oocysts/liter or more
- 3 – 3.5 log additional treatment depending on filtration in place
- Systems in Bins 2-4 select tools from a toolbox to use for additional treatment credits

IMPLEMENTATION

LT2 Rule Compliance Schedule



Binning Results and Predictions of Filtered Systems >10,000 People

Sources

- Data Collection and Tracking System (DCTS) binning report
  - Retrieved from DCTS based on Round 1 monitoring data
- Non-DCTS binning result
  - Provided by regions and states including grandfathered and "missing" system information
- Systems providing treatment instead of monitoring
- Information Collection Rule (ICR) - 350 plants in systems serving ≥ 100,000
- Information Collection Rule Supplemental Survey Large Systems (ICRSSL) - 40 plants in systems serving ≥ 100,000
- Information Collection Rule Supplemental Survey Medium Systems (ICRSSM) - 40 plants in systems serving 10,000-99,999

Binning Results and Predictions of Filtered Systems >10,000 People

Data Source	Bin 2	Bin 3	Bin 4	Percent in An Action Bin
DCTS	80	1	0	5.9% (81 of 1,381)
Non-DCTS	41	1	0	11.9% (42 of 352*)
Total	121	2	0	7.1% (123 of 1,733**)
ICR Predicted	All Bin 2 or higher			Mean=34.8 %
ICRSSL Predicted	All Bin 2 or higher			Mean=22.4%
ICRSSM Predicted	All Bin 2 or higher			Mean=27.2 %

* Assuming that the difference between 1,733 and 1,381 is the basis for non-DCTS bin determination.

** Based on monitoring baseline for filtered plants in LT2 Economic Analysis (EPA, 2006).

Systems Providing Treatment Instead of Monitoring

- 204 filtered systems submitted Intent to Provide total 5.5-Log of Treatment Instead of Monitoring (equivalent to Bin 4)
  - 21 systems serving ≥10K
  - 183 systems serving <10K
- 15 unfiltered systems submitted Intent to Provide 3-Log of Treatment Instead of Monitoring
  - 2 systems serving ≥10K
  - 13 systems serving <10K
- 51 systems had unknown filtration status

MICROBIAL TOOLBOX

Overview of Toolbox Tools

- Source Toolbox Components
  - Watershed Control Program
    - 0.5 log credit for filtered sources
    - Unfiltered systems not eligible for credit
  - Alternative Source/Intake Management
    - No prescribed credit
    - Simultaneous monitoring for treatment bin classification

Overview of Toolbox Tools (continued)

- Pre-Filtration Toolbox Components
  - Pre-sedimentation basin with coagulation
    - 0.5 log-credit for systems achieving 0.5 log turbidity reduction or state approved criteria
    - Basins must be operated continuously with coagulant addition and all plant flow must pass through the basin
  - Two-Stage Lime Softening
    - 0.5-log credit for two-stage softening where chemical addition and hardness precipitation occur in both stages.
    - All plant flow must pass through both stages
  - Bank Filtration
    - 0.5-log credit for 25-foot setback; 1.0-log credit for 50-foot setback
    - Aquifer must be unconsolidated sand containing at least 10 percent fines; average turbidity in wells must be less than 1 NTU
    - Systems using wells followed by filtration when conducting source water monitoring must sample the well to determine bin classification and are not eligible for additional credit

Overview of Toolbox Tools (continued)

- Treatment Performance Toolbox Components
  - Combined Filter Performance
    - 0.5-log credit for combined filter effluent turbidity $\leq$ 0.15 NTU in at least 95 % of measurements each month
  - Individual Filter Performance
    - 0.5-log credit (in addition to 0.5-log combined filter performance credit) if individual filter effluent turbidity $\leq$ 0.15 NTU in at least 95 % of samples each month in each filter and is never > 0.3 NTU in two consecutive measurements in any filter
  - Demonstration of Performance
    - Credit awarded to unit process or treatment train based on a demonstration to the state with a state-approved protocol

Overview of Toolbox Tools (continued)

- Additional Filtration Toolbox Options
  - Bag or Cartridge Filters (Individual)
    - Up to 2-log credit based on the removal efficiency demonstrated during challenge testing with a 1.0-log factor of safety
  - Bag or Cartridge Filters (In Series)
    - Up to 2.5-log credit based on the removal efficiency demonstrated during challenge testing with a 0.5-log factor of safety
  - Membrane Filtration
    - Log credit equivalent to removal efficiency demonstrated in challenge test for device if supported by direct integrity testing
  - Second Stage Filtration
    - 0.5-log credit for second separate granular media filtration stage if treatment train includes coagulation prior to first filter
  - Slow Sand Filters
    - 2.5-log credit as a secondary filtration step; 3.0-log credit as a primary filtration process; No prior chlorination for either option

Overview of Toolbox Tools (continued)

- Inactivation Toolbox Components
  - Chlorine Dioxide
    - Log credit based on measured CT in relation to CT table
  - Ozone
    - Log credit based on measured CT in relation to CT table
  - UV
    - Log credit based on validated UV dose in relation to UV dose table
    - Reactor validation testing required to establish UV dose and associated operating conditions

Summary of Toolbox Technology Usage- Round 1

Toolbox Options	Percentage of systems using the tool*
Watershed Control Program	10.4%
Alternative Intake/Source Management	3.1%
Pre-sedimentation basin with coagulation	2.1%
Two-Stage Lime Softening	No information available
River Bank Filtration	3.1%
Combined Filter Performance/Individual Filter Performance	37.5%/34.4%
Filter Optimization (?)	3.1%
Demonstration of Performance	3.1%
Bag or Cartridge Filters (Individual or In series)	1.0%
Membrane Filtration	15.6%
Second Stage Filtration	1.0%
Slow Sand Filters	No information available
Chlorine Dioxide	1.0%
Ozone	2.1%
UV	19.8%

***Percentage of 96 PWSs using specific tools based on information obtained from the EPA Regions and States. Some PWS reports indicat they plan to use a particular tool or that they use a tool but not it is unclear whether they claim credit for LT2 compliance purposes.**

TRAINING AND TECHNICAL ASSISTANCE BY EPA/STATES

Training and Technical Assistance

- Webinar series to introduce rule and requirements.
- Guidance Documents, Fact sheets, Small Entity compliance guide.
- Safe Drinking Water Act Hotline.
- Rule presentations and training at conferences and seminars (AWWA,ASDWA,NRWA).
- Face to face training in each EPA Region.
- Toolbox treatment tools focused webinars.
- Training and technical assistance for analytical laboratories.

COMPLIANCE STATUS

Compliance Status*-LT2ESWTR Round 1

PWS Size Category	PWSs with LT2 TT** violations	Total PWSs in size category	% LT2 TT** violations
<=500*	20	1588	1.26
501-3300*	16	1250	1.28
3301-10000*	9	961	0.94
10001-100000	4	1404	0.28
	Total violations	Total LT2 PWSs	Total % violations
Totals	49	5203	0.94

*Compliance date for PWS serving <10,000 was October 1, 2014, and the state may allow a two year extension for capital improvements.
** Treatment Technique Violations-Failure to report bin level, failure to meet bin treatment requirements, failure to meet toolbox tool performance requirements.

Data reported to SDWIS -status as of June 30,2014

SDWA Public Water System Enforcement

Presenters: Carol DeMarco King and Joyce Chandler, Office of Enforcement and Compliance Assurance, Environmental Protection Agency

PWS Enforcement Overview

- "Assuring safe drinking water" is a longstanding EPA enforcement national area of focus
- Relevant SDWA authorities include:
  - Section 1414 authorizes EPA to issue an administrative order or bring a civil action to require compliance with applicable requirements
  - Section 1431 authorizes EPA to take action administratively or judicially if a contaminant may present an imminent and substantial endangerment to the health of persons

PWS Enforcement Overview

- States and EPA may handle public water system (PWS) formal enforcement matters administratively and/or judicially
- Relief sought in PWS actions includes:
  - Install new treatment equipment to address maximum contaminant level violations
  - Improve operation and maintenance
  - Routine monitoring
  - Provide an alternate supply of water until contamination is remediated
  - Transfer system to a new owner/operator

National Drinking Water Enforcement Response Policy (ERP)

- EPA's Office of Enforcement and Compliance Assurance issued the ERP in December 2009
- Created in consultation with states and EPA's Office of Water and Regions
- Replaced complicated rule-based significant noncompliance (SNC) prioritization with a more holistic, PWS-based approach
- Enforcement Targeting Tool (ETT) developed based on the ERP's principles to provide a single ranking score for each PWS with unaddressed violation(s)

Use of the ERP

- The ERP/ETT is a management tool to help identify PWSs that rise to a level of national significance for enforcement
- EPA and states discuss priority PWSs identified by the ETT on a quarterly basis to ensure they are addressed through return to compliance (RTC) or formal enforcement
- States and EPA should not wait until a system shows up on the ETT list to take action to bring it back into compliance with SDWA and the National Primary Drinking Water Regulations (NPDWRs)

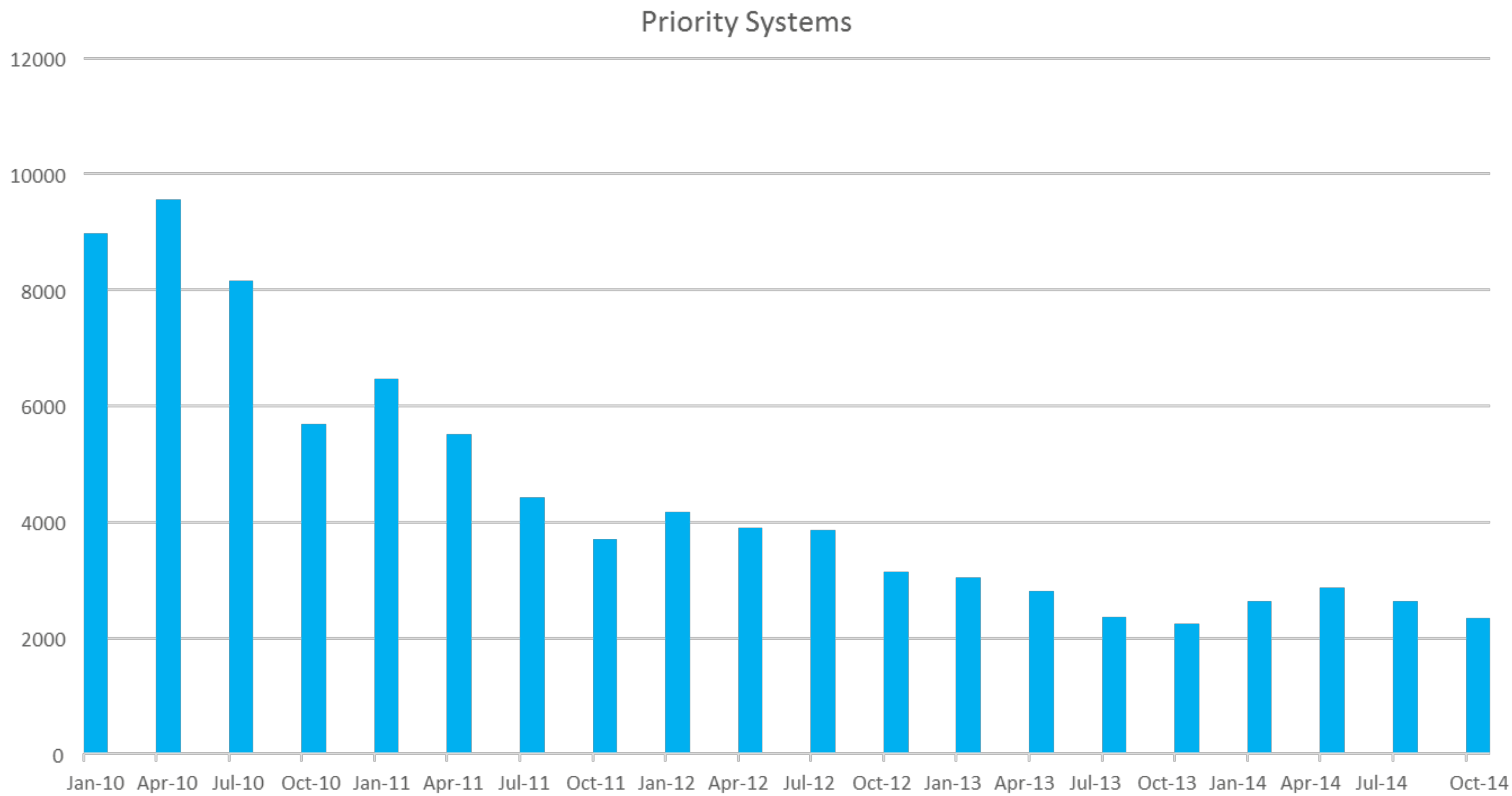
ETT Scores

- Identifies PWSs for enforcement targeting
- Scores PWSs based on unaddressed violations
- Both health-based and non-health-based violations are included and count for 1, 5 or 10 points
- PWSs with ETT scores >= 11 are priorities for enforcement
- Within six months primacy agencies must either return priority systems to compliance or initiate formal enforcement actions
- The ultimate goal is RTC

Enforcement Results under ERP/ETT

- Improved coordination with states
  - Memos issued since 2009 to further facilitate ERP implementation
  - Development of additional tools to meet regional, state and program office needs
- Decrease in the number of PWSs identified as enforcement priorities
- Increase in state enforcement actions to address priority systems

Overall Decline in Priority PWSs



ETT Scoring for LT2 Rule

- If a PWS fails to meet its deadline to install *cryptosporidium* treatment as required by 40 C.F.R. Section 141.713, then the ETT assesses 5 points
- A PWS would not become a priority for enforcement until it reaches 11 points

DISCUSSION QUESTIONS

Discussion Questions

1. The LT2 treatment compliance schedule provides flexibility by allowing for possible extensions, how do you think systems serving fewer than 100,000 persons could maximize the benefits of such extensions when seeking to annualize the capital investments?

2. What challenges have you observed or been made aware of with regard to systems in your states having trouble complying with the LT2 treatment compliance schedule?

3. What additional flexibility do you believe may exist with respect to treatment or management options as well as for timelines for implementing these options?

4. What are your recommendations about interim options for ensuring protection of human health and the environment under the rule without the use of enforcement action or an administrative order"?
   - What would be your response to those systems who have taken measures to install treatment in accordance to the LT2 rule to avoid non-compliance and might question why EPA is rewarding systems who delay actions to become compliant?

EPA
United States
Environmental Protection
Agency

Long Term 2 Enhanced Surface Water Treatment Rule: A Quick Reference Guide For Schedule 2 Systems

Overview of the Rule

Title	Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) 71 FR 654, January 5, 2006, Vol. 71, No. 3
Purposes	Improve public health protection through the control of microbial contaminants by focusing on systems with elevated *Cryptosporidium* risk. Prevent significant increases in microbial risk that might otherwise occur when systems implement the Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR).
General Description	The LT2ESWTR requires systems to monitor their source water, calculate an average *Cryptosporidium* concentration, and use those results to determine if their source is vulnerable to contamination and may require additional treatment.
Utilities Covered	• Public water systems (PWSs) that use surface water or ground water under the direct influence of surface water (GWUDI). • Schedule 2 systems include PWSs serving 50,000 to 99,999 people OR wholesale PWSs that are part of a combined distribution system in which the largest system serves 50,000 to 99,999 people.

Major Provisions

Control of *Cryptosporidium*

Source Water Monitoring	Filtered and unfiltered systems must conduct 24 months of source water monitoring for *Cryptosporidium*. Filtered systems must also record source water *E. coli* and turbidity levels. Filtered systems will be classified into one of four "Bins" based on the results of their source water monitoring. Unfiltered systems will calculate a mean *Cryptosporidium* level to determine treatment requirements. Systems may also use previously collected data (i.e., Grandfathered data). Filtered systems providing at least 5.5 log of treatment for *Cryptosporidium* and unfiltered systems providing at least 3-log of treatment for *Cryptosporidium* and those systems that intend to install this level of treatment are not required to conduct source water monitoring.
Installation of Additional Treatment	Filtered systems must provide additional treatment for *Cryptosporidium* based on their bin classification (average source water *Cryptosporidium* concentration), using treatment options from the "microbial toolbox." Unfiltered systems must provide additional treatment for *Cryptosporidium* using chlorine dioxide, ozone, or UV.
Uncovered Finished Water Storage Facility	Systems with an uncovered finished water storage facility must either: • Cover the uncovered finished water storage facility; or, • Treat the discharge to achieve inactivation and/or removal of at least 4-log for viruses, 3-log for *Giardia lamblia*, and 2-log for *Cryptosporidium*.

Disinfection Profiling and Benchmarking

After completing the initial round of source water monitoring any system that plans on making a significant change to their disinfection practices must:

- Create disinfection profiles for *Giardia lamblia* and viruses;
- Calculate a disinfection benchmark; and,
- Consult with the state prior to making a significant change in disinfection practice.

Bin Classification For Filtered Systems

Cryptosporidium Concentration (oocysts/L)	Bin Classification	Additional *Cryptosporidium* Treatment Required			Alternative Filtration
		Conventional Filtration	Direct Filtration	Slow Sand or Diatomaceous Earth Filtration	
< 0.075	Bin 1	No additional treatment required	No additional treatment required	No additional treatment required	No additional treatment required
0.075 to < 1.0	Bin 2	1 log	1.5 log	1 log	(1)
1.0 to < 3.0	Bin 3	2 log	2.5 log	2 log	(2)
≥ 3.0	Bin 4	2.5 log	3 log	2.5 log	(3)

(1) As determined by the state (or other primacy agency) such that the total removal/inactivation > 4.0-log.
(2) As determined by the state (or other primacy agency) such that the total removal/inactivation > 5.0-log.
(3) As determined by the state (or other primacy agency) such that the total removal/inactivation > 5.5-log.

Inactivation Requirements for Unfiltered Systems

Cryptosporidium Concentration (oocysts/L)	Required *Cryptosporidium* Inactivation
≤ 0.01	2-log
> 0.01	3-log

Critical Deadlines and Requirements

For Drinking Water Systems (Schedule 2)

January 1, 2007	**Systems must submit their:** ‣ **Sampling schedule that specifies the dates of sample collection and location of sampling for initial source water monitoring to EPA electronically; or** ‣ **Notify EPA or the state of the systems intent to submit results for grandfathering data; or** ‣ **Notify EPA or the state of the systems intent to provide at least 5.5 log of treatment for *Cryptosporidium*. Systems should consult with EPA or their state prior to submitting this notice.**
April 2007	**No later than this month, systems must begin 24 months of source water monitoring.**
June 10, 2007	**System submit results for first month of source water monitoring.**
June 1, 2007	**No later than this date, systems must submit monitoring results for data that they want to have grandfathered.**
April 1, 2008	**No later than this date, systems must notify the EPA or the state of all uncovered treated water storage facilities.**
March 2009	**No later than this month, systems must complete their inital round of source water monitoring.**
April 1, 2009	**No later than this date, uncovered finished water storage facilities must be covered, or the water must be treated before entry into the distribution system, or the system must be in compliance with a state approved schedule.**
September 2009	**No later than this month, filtered systems must report their initial bin classification to the EPA or the state for approval.**
September 2009	**No later than this month, unfiltered systems must report the mean of all *Cryptosporidium* sample results to the EPA or the state.**
September 30, 2012	**Systems must install and operate additional treatment in accordance with their bin classification.†**
July 1, 2015	**Systems must submit their sampling schedule that specifies the dates of sample collection and location of sampling for second round of source water monitoring to the state.**
Ocotber 1, 2015	‣ **Systems are required to begin conducting a second round of source water monitoring.** ‣ **Based on the results, systems must re-determine their bin classification and provide additional *Cryptosporidium* treatment, if necessary.**

For States

January - June 2006	**States are encouraged to communicate with affected systems regarding LT2ESWTR requirements.**
April 1, 2007	**States are encouraged to communicate LT2ESWTR requirements related to treatment, uncovered finished water reservoirs, and disinfection profiling to affected systems.**
October 5, 2007	**States are encouraged to submit final primacy applications or extension requests to EPA.**
January 5, 2008	**Final primacy applications must be submitted to EPA, unless granted an extension.**
December 31, 2008	**States should begin awarding *Cryptosporidium* treatment credit for primary treatments in place.**
January 5, 2010	**Final primacy revision applications from states with approved 2-year extensions agreements must be submitted to EPA.**
June 30, 2013	**States should award *Cryptosporidium* treatment credit for toolbox option implementation.**

† States may allow up to an additional 24 months for compliance for systems making capital improvements.

For additional information on the LT2ESWTR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at www.epa.gov/safewater; or contact your State drinking water representative.

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Source Water Monitoring	Filtered and unfiltered systems must conduct 24 months of source water monitoring for *Cryptosporidium*. Filtered systems must also record source water *E. coli* and turbidity levels. Filtered systems will be classified into one of four "Bins" based on the results of their source water monitoring. Unfiltered systems will calculate a mean *Cryptosporidium* level to determine treatment requirements. Systems may also use previously collected data (i.e., Grandfathered data). Filtered systems providing at least 5.5 log of treatment for *Cryptosporidium* and unfiltered systems providing at least 3-log of treatment for *Cryptosporidium* and those systems that intend to install this level of treatment are not required to conduct source water monitoring.
Installation of Additional Treatment	Filtered systems must provide additional treatment for *Cryptosporidium* based on their bin classification (average source water *Cryptosporidium* concentration), using treatment options from the "microbial toolbox." Unfiltered systems must provide additional treatment for *Cryptosporidium* using chlorine dioxide, ozone, or UV.
Uncovered Finished Water Storage Facility	Systems with an uncovered finished water storage facility must either: • Cover the uncovered finished water storage facility; or, • Treat the discharge to achieve inactivation and/or removal of at least 4-log for viruses, 3-log for *Giardia lamblia*, and 2-log for *Cryptosporidium*.

Disinfection Profiling and Benchmarking

After completing the initial round of source water monitoring any system that plans on making a significant change to their disinfection practices must:

- Create disinfection profiles for *Giardia lamblia* and viruses;
- Calculate a disinfection benchmark; and,
- Consult with the state prior to making a significant change in disinfection practice.

Bin Classification For Filtered Systems

Cryptosporidium Concentration (oocysts/L)	Bin Classification	Additional *Cryptosporidium* Treatment Required			Alternative Filtration
		Conventional Filtration	Direct Filtration	Slow Sand or Diatomaceous Earth Filtration	
< 0.075	Bin 1	No additional treatment required	No additional treatment required	No additional treatment required	No additional treatment required
0.075 to < 1.0	Bin 2	1 log	1.5 log	1 log	(1)
1.0 to < 3.0	Bin 3	2 log	2.5 log	2 log	(2)
≥ 3.0	Bin 4	2.5 log	3 log	2.5 log	(3)

(1) As determined by the state (or other primacy agency) such that the total removal/inactivation > 4.0-log.
(2) As determined by the state (or other primacy agency) such that the total removal/inactivation > 5.0-log.
(3) As determined by the state (or other primacy agency) such that the total removal/inactivation > 5.5-log.

Inactivation Requirements for Unfiltered Systems

Cryptosporidium Concentration (oocysts/L)	Required *Cryptosporidium* Inactivation
≤ 0.01	2-log
> 0.01	3-log

Critical Deadlines and Requirements

For Drinking Water Systems (Schedule 3)	
January 1, 2008	**Systems must submit their:** • **Sampling schedule that specifies the dates of sample collection and location of sampling for initial source water monitoring to EPA electronically; or** • **Notice to EPA or the state of the system's intent to submit results for grandfathering data; or** • **Notice to EPA or the state of the system's intent to provide at least 5.5-log of treatment for *Cryptosporidium* for filtered systems or 3-log of treatment for unfiltered systems. Systems should consult with EPA or their state prior to submitting this notice.**
April 2008	**No later than this month, systems must begin 24 months of source water monitoring.**
April 1, 2008	**No later than this date, systems must notify the EPA or the state of all uncovered treated water storage facilities.**
June 10, 2008	**Systems submit results for first month of source water monitoring.**
June 1, 2008	**No later than this date, systems must submit monitoring results for data that they want to have grandfathered.**
April 1, 2009	**No later than this date, uncovered finished water storage facilities must be covered, or the water must be treated before entry into the distribution system, or the system must be in compliance with a state approved schedule.**
March 2010	**No later than this month, systems must complete their inital round of source water monitoring.**
September 2010	**No later than this month, filtered systems must report their initial bin classification to the EPA or the state for approval.**
September 2010	**No later than this month, unfiltered systems must report the mean of all *Cryptosporidium* sample results to the EPA or the state.**
September 30, 2013	**Systems must install and operate additional treatment in accordance with their bin classification (filtered systems) or mean *Cryptosporidium* level (unfiltered systems).†**
July 1, 2016	**Systems must submit their sampling schedule that specifies the dates of sample collection and location of sampling for second round of source water monitoring to the state.**
Ocotber 1, 2016	• **Systems are required to begin conducting a second round of source water monitoring.** • **Based on the results, systems must re-determine their bin classification (filtered systems) or mean *Cryptosporidium* level (unfiltered systems) and provide additional *Cryptosporidium* treatment, if necessary.**
For States	
July - December 2006	**States are encouraged to communicate with affected systems regarding LT2ESWTR requirements.**
April 1, 2007	**States are encouraged to communicate LT2ESWTR requirements related to treatment, uncovered finished water reservoirs, and disinfection profiling to affected systems.**
October 5, 2007	**States are encouraged to submit final primacy applications or extension requests to EPA.**
January 5, 2008	**Final primacy applications must be submitted to EPA, unless granted an extension.**
December 31, 2009	**States should begin determining *Cryptosporidium* treatment credit for primary treatments already in place.**
January 5, 2010	**Final primacy revision applications from states with approved 2-year extensions agreements must be submitted to EPA.**
June 30, 2014	**States should award *Cryptosporidium* treatment credit for toolbox option implementation.**

† States may allow up to an additional 24 months for compliance for systems making capital improvements.

For additional information on the LT2ESWTR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at www.epa.gov/safewater/disinfection/lt2; or contact your state drinking water representative.

United States Environmental Protection Agency

Long Term 2 Enhanced Surface Water Treatment Rule: A Quick Reference Guide For Schedule 4 Systems

Overview of the Rule

Title	Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) 71 FR 654, January 5, 2006, Vol. 71, No. 3
Purposes	Improve public health protection through the control of microbial contaminants by focusing on systems with elevated *Cryptosporidium* risk. Prevent significant increases in microbial risk that might otherwise occur when systems implement the Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR).
General Description	The LT2ESWTR requires systems to monitor their source water, calculate an average *Cryptosporidium* concentration, and use those results to determine if their source is vulnerable to contamination and may require additional treatment. Filtered systems serving fewer than 10,000 may be eligible to conduct *E. Coli* source water monitoring in lieu of *Cryptosporidium* monitoring.
Utilities Covered	• Public water systems (PWSs) that use surface water or ground water under the direct influence of surface water (GWUDI). • Schedule 4 systems include PWSs serving fewer than 10,000 people OR wholesale PWSs that are part of a combined distribution system in which the largest system serves less than 10,000 people.

Major Provisions

Control of *Cryptosporidium*

Source Water Monitoring	Filtered systems must conduct 12 months of source water monitoring for *E. coli* . If the *E. coli* trigger level is exceeded, the system must conduct an additional 12 to 24 months of source water monitoring for *Cryptosporidium*. Systems may also use previously collected data (i.e., Grandfathered data). Unfiltered systems must sample their source water for *Cryptosporidium* at least twice per month for 12 months or once per month for 24 months. Unfiltered systems will calculate a mean *Cryptosporidium* level to determine treatment requirements. Filtered systems providing at least 5.5 log of treatment for *Cryptosporidium* and unfiltered systems providing at least 3-log of treatment for *Cryptosporidium* and those systems that intend to install this level of treatment are not required to conduct source water monitoring.
Installation of Additional Treatment	Filtered systems must provide additional treatment for *Cryptosporidium* based on their bin classification (average source water *Cryptosporidium* concentration), using treatment options from the "microbial toolbox." Unfiltered systems must provide additional treatment for *Cryptosporidium* using chlorine dioxide, ozone, or UV.
Uncovered Finished Water Storage Facility	Systems with an uncovered finished water storage facility must either: • Cover the uncovered finished water storage facility; or, • Treat the discharge to achieve inactivation and/or removal of at least 4-log for viruses, 3-log for *Giardia lamblia*, and 2-log for *Cryptosporidium*.

Disinfection Profiling and Benchmarking

After completing the initial round of source water monitoring any system that plans on making a significant change to their disinfection practices must:

- Create disinfection profiles for *Giardia lamblia* and viruses;
- Calculate a disinfection benchmark; and,
- Consult with the state prior to making a significant change in disinfection practice.

Bin Classification For Filtered Systems

Cryptosporidium Concentration (oocysts/L)	Bin Classification	Additional *Cryptosporidium* Treatment Required			Alternative Filtration
		Conventional Filtration	Direct Filtration	Slow Sand or Diatomaceous Earth Filtration	
< 0.075	Bin 1††	No additional treatment required			
0.075 to < 1.0	Bin 2	1 log	1.5 log	1 log	(1)
1.0 to < 3.0	Bin 3	2 log	2.5 log	2 log	(2)
≥ 3.0	Bin 4	2.5 log	3 log	2.5 log	(3)

†† Systems serving < 10,000 people that are not required to monitor for *Cryptosporidium* are placed in Bin 1.
(1) As determined by the state (or other primacy agency) such that the total removal/inactivation > 4.0-log.
(2) As determined by the state (or other primacy agency) such that the total removal/inactivation > 5.0-log.
(3) As determined by the state (or other primacy agency) such that the total removal/inactivation > 5.5-log.

Inactivation Requirements for Unfiltered Systems

Cryptosporidium Concentration (oocysts/L)	Required *Cryptosporidium* Inactivation
≤ 0.01	2-log
> 0.01	3-log

For additional information on the LT2ESWTR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at www.epa.gov/safewater/disinfection/lt2; or contact your state drinking water representative.

July 1, 2008	Systems must submit their: • Sampling schedule that specifies the dates of sample collection and location of sampling for initial source water monitoring; or • Notice to EPA or the state of the system's intent to submit results for grandfathering data; or • Notice to EPA or the state of the system's intent to provide at least 5.5-log of treatment for *Cryptosporidium* for filtered systems or 3-log of treatment for unfiltered systems. Systems should consult with EPA or their state prior to submitting this notice. • Notice to EPA or the state of the system's intent to conduct *Cryptosporidium* monitoring instead of *E. coli* monitoring.
October 2008	No later than this month, filtered systems must begin 12 months of bi-weekly source water monitoring for *E. coli*.
December 1, 2008	No later than this date, systems must submit *E. coli* monitoring results for data that they want to have grandfathered.
December 10, 2008	Systems submit results for first month of *E. coli* source water monitoring.
April 1, 2008	No later than this date, systems must notify the EPA or the state of all uncovered treated water storage facilities.
April 1, 2009	No later than this date, uncovered finished water storage facilities must be covered, or the water must be treated before entry into the distribution system, or the system must be in compliance with a state approved schedule.
September 2009	No later than this month, systems that were required to monitor their source water for *E. coli* complete their inital round of source water monitoring.
January 1, 2010	Filtered systems required to monitor for *Cryptosporidium* must submit their sampling schedule that specifies the dates of sample collection and location of sampling for source water monitoring.
April 2010	No later than this month, systems required to conduct *Cryptosporidium* monitoring must begin 12 or 24 months of source water monitoring.
June 1, 2010	No later than this date, systems must submit *Cryptosporidium* monitoring results for data that they want to have grandfathered.
June 10, 2010	Systems submit results for first month of *Cryptosporidium* source water monitoring.
March 2012	No later than this month, systems that were required to monitor their source water for *Cryptosporidium* complete their inital round of source water monitoring
September 2012	No later than this month, filtered systems that were required to monitor their source water for *Cryptosporidium* must report their initial bin classification to the EPA or the state for approval.
September 2012	No later than this month, unfiltered systems must report the mean of all *Cryptosporidium* sample results to the EPA or the state.
September 30, 2014	Systems must install and operate additional treatment in accordance with their bin classification or mean *Cryptosporidium* level.†
July 1, 2017	Systems must submit their sampling schedule that specifies the dates of sample collection and location of sampling for second round of *E. coli* source water monitoring to the state.
October 1, 2017	Systems are required to begin conducting a second round of *E. coli* source water monitoring. Based on the results, systems must re-determine their bin classification and provide additional treatment, if necessary.
January 1, 2019	Systems must submit their sampling schedule that specifies the dates of sample collection and location of sampling for second round of *Cryptosporidium* source water monitoring to the state.
April 1, 2019	Systems are required to begin conducting a second round of *Cryptosporidium* source water monitoring. Based on the results, systems must re-determine their bin classification (filtered systems) or mean *Cryptosporidium* level (unfiltered systems) and provide additional treatment, if necessary.
July - December 2006	States are encouraged to communicate with affected systems regarding LT2ESWTR requirements.
April 1, 2007	States are encouraged to communicate LT2ESWTR requirements related to treatment, uncovered finished water reservoirs, and disinfection profiling to affected systems.
October 5, 2007	States are encouraged to submit final primacy applications or extension requests to EPA.
January 5, 2008	Final primacy applications must be submitted to EPA, unless granted an extension.
June 30, 2010	States should begin determining *Cryptosporidium* treatment credit for primary treatments already in place.
January 5, 2010	Final primacy revision applications from states with approved 2-year extensions agreements must be submitted to EPA.
June 30, 2015	States should award *Cryptosporidium* treatment credit for toolbox option implementation.

† States may allow up to an additional 24 months for compliance for systems making capital improvements.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 8 2009

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

MEMORANDUM

SUBJECT: Proposed Revision to Enforcement Response Policy for the Public Water System Supervision (PWSS) Program under the Safe Drinking Water Act and Implementation of the Enforcement Targeting Tool

FROM: Mark Pollins, Director
Water Enforcement Division
Office of Civil Enforcement

for Karin Koslow, Acting Director R. Farrell
Compliance Assistance and Sector Programs Division
Office of Compliance

TO: Office of Regional Counsel, Regions 1-10
Drinking Water Program Managers, Regions 1-10
Drinking Water Enforcement Managers, Regions 1-10
Association of State Drinking Water Administrators

Introduction

EPA is proposing a new approach for enforcement targeting under the Safe Drinking Water Act (SDWA) for Public Water Systems. The new approach is designed to identify public water systems with violations that rise to a level of significant noncompliance by focusing on those systems with health-based violations and those that show a history of violations across multiple rules. This system-based methodology is intended to ensure consistency and the integrity of the PWSS national enforcement program. The new approach includes a revised Enforcement Response Policy (ERP) and new Enforcement Targeting Tool (ETT).

The Enforcement Response Policy and Enforcement Targeting Tool re-emphasize a focus on "return to compliance" (RTC) rather than simply "addressing" a violation. The policy is intended to increase our effectiveness in the protection of public health. Together the ERP and ETT will prioritize and direct enforcement response to systems with the most systemic noncompliance by considering all violations incurred by a system in a comprehensive way. The policy and tool identify priority systems for enforcement response, provide a model to escalate responses to violations; define timely and appropriate actions; and clarify what constitutes a formal action.

In general, the goal of the revised ERP and new ETT is to allow States and EPA to:

- Align public water system violations of the Safe Drinking Water Act within a prioritization that is more protective of public health;
- View public water system compliance status comprehensively;
- Ensure that both EPA and the States act on and resolve drinking water violations;
- Recognize the validity of informal enforcement response efforts while ensuring that, if these efforts have proven ineffective, enforceable and timely action is taken;
- Ensure that EPA and the States escalate enforcement efforts based on the prioritization approach;
- Increase the effectiveness of state and federal enforcement targeting efforts by providing a "tool" that calculates comprehensive noncompliance status for all systems and identifies those systems not meeting national expectations as set by EPA. It also provides an additional resource for identifying systems possibly in need of other State/EPA assistance in the areas of Capacity Development and Sustainability.

The final revised Enforcement Response Policy will supersede the following existing guidance by revising the definition of "timely" and "appropriate" enforcement response: *"Change in the PWSS Program's Definition of Timely and Appropriate Actions"* WSG 56 (Water Supply Guidance), April 20, 1990 and *"Revised Definition of Significant Non-complier (SNC) and the Model for Escalating Responses to Violations for the PWSS Program"* WSG 57 (Water Supply Guidance), May 22, 1990.

Identification of Priority Systems for Enforcement Using the Enforcement Targeting Tool

This system-based approach uses a tool that enables the prioritization of public water systems by assigning each violation a "weight" or number of points based on the assigned threat to public health. For example, a violation of a microbial rule maximum contaminant level will carry more weight than that of a Consumer Confidence Report reporting violation. Points for each violation at a water system are summed to provide a total score for that water system. Water systems whose scores exceed a certain threshold will be considered a priority system for enforcement. Based on this approach, States and EPA will be able to target resources to address those public water systems which EPA determines have the most significant problems.

Currently it is difficult to identify a systematic pattern of violations for a PWS because the focus of the current approach has been to assign "significant non-compliance" (SNC) status based on failure to comply with individual drinking water rules. Under the existing system, all SNCs are treated equally, without regard to the gravity of the violation and without considering other violations a system may have that are not identified as SNC. The new approach will look at PWS noncompliance comprehensively across all rules without using the rule-based SNC definitions and will ultimately replace the current rule-based SNC definitions to identify systems that are a high priority for an enforcement response.

Enforcement Targeting Formula

The enforcement targeting formula is the basis for the enforcement targeting tool that identifies public water systems having the highest total noncompliance across all rules, within a designated period of time. A higher weight is placed on health-based violations (including Treatment Technique and Maximum Contaminant Level violations). The formula calculates a score for each water system based on open ended violations and violations that have occurred over the past 5 years, but does not include violations that have returned to compliance or are on the "path to compliance" through a specified enforceable action. The "path to compliance" is the status of a public water system that has been placed under an enforceable action to return it to compliance. These enforceable actions have different names in different states but the characteristic they all share is that an enforceable consequence results if the schedule is not met. The formula only considers violations for Federally-regulated contaminants.

As part of any State or Federal program, it is expected that enforceable actions will be adequately tracked to make certain compliance is ultimately achieved.

The formula provides a rank-order of all public water systems based on the total points assigned for each violation and the length of time since the first unaddressed violation. The factors of the formula are:

- The severity of the violation—which is based on a modification of Public Notification Tiers, as set forth in Title 40 of the Code of Federal Regulations at Part 141, Subpart Q, "Public Notification of Drinking Water Violations," Section 141.201. The severity or weight of the violation is highest for acute contaminant health based violations, with a lower weight for chronic and other health based violations (and nitrate monitoring and total coliform repeat monitoring violations), and with the lowest weighting for other monitoring, reporting, and other violations.

- The number of years that a system's violations have been unaddressed

For each public water system (PWS), a point score of non-compliance is calculated using this formula:

$$\boxed{\textbf{Sum } (S_1+S_2+S_3+\ldots) + n}$$

The total points for each violation are added together, and a time factor is added to achieve the total score for the public water system, where:

S = violation severity factor

10 For each acute health-based violation

5 For each other health-based violation and Total Coliform Rule (TCR) repeat monitoring violation

For each Nitrate monitoring and reporting violation

1 For each other monitoring and reporting, or any other violation

n = number of years that the system's oldest violations have been unaddressed (0 to 5)

Examples of Priority Systems for Enforcement

During the trial period, any public water system with a score resulting from the application of the enforcement targeting formula which is greater than or equal to 11 points will be considered a priority system for an enforcement response under this policy. Public water systems whose violations score at this level have at least one recent acute health-based violation, or at least two recent other non-acute health-based violations, or eleven other recent non-health-based violations. The following table illustrates examples of how a public water system may exceed the 11-point threshold:

Violations (S)	Years since first unaddressed violation (n)	Score $(\Sigma S)+n$	
2 acute turbidity exceedances	0 (occurred in current year)	(10+10)+0	=20
2 non-acute TCR MCL violations	1 (1 in previous year)	(5+5) +1	=11
11 monthly TCR monitoring violations	0 (all in current year)	(1+1+1+1+1+1+1+1+1+1+1) +0	=11
6 quarterly TCR monitoring violations, 1 annual nitrate monitoring violation	1 (first violations occurred in previous year)	((1+1+1+1+1+1)+5) + 1	=12
Failure to monitor annual VOC, SOC, IOC, Stage 1 DBP and 2 TCR MCL	2 (chemical violations occurred 2 years ago)	((1+1+1+1)+5+5) + 2	=16

Violations of tier 1 public notification requirements are significant because they reflect the failure to provide critical and real-time information to the public regarding drinking water. Although these violations are assigned a "1" under the policy, they would, by definition, be accompanied by an underlying violation of the health-based standard and would receive a score of at least 11.

Model for Escalating Responses to Violations

The existing model for escalating responses to violations sets forth EPA's expectation for EPA and the States' responses to a violation. The following concepts continue to be part of this new Enforcement Response Policy:

> The primacy agency should respond to each violation of the national primary drinking water regulations.
>
> Responses to violations should escalate in formality as the violation continues or recurs.
>
> Some violations are very serious and pose an immediate risk to public health. In these circumstances, it is appropriate to proceed directly to a formal action, such as an emergency administrative order, an injunction or a temporary restraining order (TRO), or an emergency civil referral.
>
> States have primary enforcement responsibility, and EPA retains independent enforcement authority under the Safe Drinking Water Act. In cases where the EPA Region is directly implementing the program "State" should be read to include the EPA Regional office. In addition, these guidelines should not be interpreted to preclude federal action at any point in the process if the situation warrants it.
>
> Historically, the majority of enforcement actions taken for violations at public water systems are administrative in nature and these actions continue to be an important tool. Judicial cases also are an important enforcement tool and the use of judicial authority is encouraged.

EPA recognizes that States carry out both formal and informal enforcement and compliance assistance activities. These activities are effective tools for achieving compliance. Nevertheless, systems specifically identified by the targeting tool as priorities must be returned to compliance (RTC) or EPA will expect formal, enforceable mechanisms to return such systems to compliance. States will be expected to escalate their response to ensure that return to compliance is accomplished. Systems that are unable to sustain compliance should receive additional scrutiny.

Timely and Appropriate Response

Once a PWS is identified as an enforcement priority on the targeted list, an appropriate formal action or return to compliance will be required within two calendar quarters to be considered "timely." However, regardless of a public water system's position on a State's enforcement target list, EPA expects that States will act immediately on acute, health-based violations and subsequently confirm that systems with such violations return to compliance.

Formal enforcement response includes: administrative orders with and without penalty, civil/criminal referral, and civil/criminal case filed. (See Table A, below, for a complete list.) Nevertheless, it should be noted that EPA has broad prosecutorial discretion to discuss specific timetables and mechanisms to return a system to compliance. For example, if a system can show that RTC is imminent but for reasons such as installation of new treatment or construction or other reason, RTC may take just over two quarters, EPA may not require a formal action by the State to give the system the opportunity to RTC. This discretion allows for some flexibility for systems that simply need a little more time but whose return to compliance is imminent. It is not, however, something that can be extended indefinitely as a way to avoid formal action.

The return to compliance or enforcement action needs to be achieved within two quarters of a system appearing as a priority system for enforcement and recorded such that it is reflected in the next update of the national database. For example, if a system is identified in January as an enforcement priority, the state would have until June to RTC the system's violations or take a formal enforcement action. The return to compliance or enforcement action should be reported to EPA so that it is reflected in the Federal database in October.

Formal Enforcement

EPA has defined what constitutes a "formal" enforcement response in Water Supply Guidance 27 (WSG 27), "*Guidance for FY 1987 PWSS Enforcement Agreements*". That guidance states: "According to the Agency's policy framework, a formal action is defined as one which requires specific actions necessary for the violator to return to compliance, is based on a specific violation, and is independently enforceable without having to prove the original violation". The definition of "formal" enforcement response in WSG 27 will be adopted by this Policy. A formal enforcement action has the intent and effect of bringing a non-compliant system back into compliance by a certain time with an enforceable consequence if the schedule is not met. This may be accomplished through a variety of mechanisms, depending on a State's legal authorities. The enforcement mechanism selected by the State must (1) contain a description of the non-compliant violation, a citation to the applicable State, or federal law or rule, a statement of what is required to return to compliance, and a compliance schedule; and (2) provide the State with authority to impose penalties for violation of the State's enforcement document.

Trial and Implementation of the Enforcement Response Policy and Targeting Tool

During the trial period, EPA will generate a national scored list using the enforcement targeting tool and formula described above. This list will include only systems with violations that have not been returned to compliance nor are on the path to compliance. Systems on the list with a score of 11 points or more will be considered as priority systems for enforcement response. This list will also indicate those systems that scored 11 points or higher on a previous list for tracking systems on the path to compliance and to help ensure return to compliance is achieved. EPA and the States will discuss the priority water systems on the list each quarter and determine additional steps that may be needed to achieve RTC.

As discussed above, a State may use initial compliance assistance to resolve the violations, as long as the return to compliance (RTC) takes place within two quarters of the system appearing as a priority for enforcement response. If RTC is not likely during those two quarters, escalation of the response is expected via an enforceable action within the "timely" period to compel the system to RTC in the shortest time possible. In many cases, this response will be in the form of an administrative order with or without penalties or other enforceable mechanism. States will enter the appropriate code in the SDWIS data base to reflect the State formal action or that compliance has been achieved.

Once a system's violations are on the path to compliance (i.e. incorporated into a formal enforcement action) or returned to compliance, the system drops off the targeting list and is no longer a priority for enforcement response. Those systems on the path to compliance will continue to be tracked by States and EPA until return to compliance is achieved with appropriate escalated enforcement response, as necessary.

Return to compliance is the ultimate goal and the State and Federal data systems should reflect all final return to compliance codes.

Defining the Status of Systems on the "Targeting List"

Until a State has returned a system's violations to compliance, the violations have not been completely resolved. The following categories are the general categories that States and EPA can use when discussing whether a system's violations are being adequately addressed. The focus under the new Enforcement Response Policy is to have a public water system return to compliance in the shortest time possible.

No Action/Unaddressed- Violation reported by State, with either no action taken to return the public water system to compliance, or where the initial informal action(s) or compliance assistance have not been successful to return to compliance. Further action will be needed.

Returned to Compliance- The public water system has completed monitoring, reporting or implementation of treatment or other activities to be in compliance with the regulations. All forms of compliance assistance and informal or formal enforcement actions are appropriate means to return to compliance. The appropriate return to compliance code shall be entered into SDWIS.

Unresolved but on the Path to Compliance: This category includes systems that have an EPA or State enforceable compliance order or schedule in place to resolve violations. In these cases, formal enforcement is expected to be successful toward implementing a schedule for sampling, treatment or construction, and therefore no further enforcement is required. The State and/or EPA will continue to monitor compliance with schedules and other requirements of the order.

Unresolved: Systems with continuing, ongoing violations that have had compliance assistance, informal and/or formal enforcement response without a return to compliance. This category is for those systems with a chronic failure to return to compliance.

Additional Factors to Consider in the Evaluation of the Targeting Formula: ***Population and System-Type Factors***

The joint EPA-ASDWA workgroup recommended initiating the policy using the formula previously described. However, there was significant discussion over whether population and system type factors should be included in the formula. Concern was generally expressed that an emphasis on large population systems might skew the relative ranking of systems toward those servicing large population centers. Care must be given, however, to make certain small systems receive attention, particularly since those systems often serve vulnerable populations and have the most difficulty maintaining compliance. During the trial period evaluation, EPA requests that States consider whether including population and system-type factors, or other variables, should be incorporated into the targeting formula. The details of this analysis may be found in the Appendix to this Memorandum.

Safe Drinking Water Information System {SDWIS) Enforcement Codes and Descriptions

The following table evaluates the existing enforcement codes available for use in SDWIS and categorizes them into formal and informal categories.

FORMAL According to the Agency's Policy Framework, a formal action is defined as:

- One which requires specific actions necessary for the violator to return to compliance,
- Is based on a specific violation, and
- Is independently enforceable without having to prove the original violation.

A formal enforcement action has the intent and effect of bringing a non- compliant system back into compliance by a certain time with an enforceable consequence if the schedule is not met. This may be accomplished through a variety of mechanisms, depending on a State's legal authorities.

To be formal, the enforcement mechanism selected by the State must:

1. Contain a description of the non-compliant violation, a citation to the applicable State, or federal law or rule, a statement of what is required to return to compliance, and a compliance schedule; and
2. Provide the State with authority to impose penalties for violation of the State's enforcement document.

Current SDWIS Code	Description
SFL or EFL	St or Fed AO (w/o penalty) issued
SFO	St AO (w/penalty) issued
None – closest in SFK or EFK	*St or Fed BSA signed (if meets "Formal" definition)*
SF& or EF&	St or Fed Crim Case referred to AG
SF9 or EF9	St or Fed Civil Case referred to AG or Fed case referred to DOJ
SFQ or EFQ	St or Fed Civil Case filed
SFV or EFV	St or Fed Crim Case filed
EF/	Fed 1431 (Emergency) Order
SF% or EF%	*St or Fed Civil Case concluded*
SFR or EFR	*St or Fed Consent Decree/Judgment*
SFQ or EFW	*St or Fed Criminal Case concluded*
SFM	*St Admin Penalty assessed* *NOTE: EPA recognizes the use of administrative penalty actions as a valid tool to move a system toward compliance even though the penalty action may not include a compliance schedule per EPA's definition of "formal action".*

EF-	*Fed Compliant for Penalty Consent Agreement/Final Order with penalty*
EF=	*Fed Compliant for Penalty Default Judgment*
EF<	*Fed Compliant for Penalty issued*
Once a system reaches the level of a priority system for enforcement, the actions above will put the system on the path to compliance. These systems will continue to be tracked until a resolution is achieved.	

*Changes from the current “addressing” approach are in italics.

Resolving		
SOX or EOX	St or Fed Compliance achieved	
SO0 or EO0	St or Fed No Longer Subject to Rule	
SO6 or EO6 for violation types 9, 12, 29, 37, 56, 57, 58, 59, 63, 64.	St or Fed International no-action for violation types: 9 Record Keeping; 12 Treatment Technique No Certif. Operator; 29 M&R Filter Profile/CPE Failure; 37 Treatment Technique State Prior Approval; **the following codes are also applicable if a PWS has “tested back into compliance” and no longer has Lead/cooper results over the action level:** 56 Initial, Follow-up, or Routine SOWT M&R ; 57 OCCT Study Recommendation; 58 OCCT Installation/ Demonstration; 59 WQP Entry Point Non-Compliance; 63 MPL Non-Compliance; 64 Lead Service Line Replacement (LSLR)	
These six resolving actions/ codes mean that the violation has been resolved either by return to compliance, a determination that the rule is no longer applicable, or a determination that no further action is needed.		

Note that any violation that has one of the above Formal or Resolving codes will not count against a system’s total score using the formula.

INFORMAL	The actions below are informal. Violation with these codes will continue to count against a system until a formal or resolving action is taken and recorded in SDWIS/Fed. If a system has reached the level of a priority system for enforcement, these actions with **NOT** count for putting the system on a "path to compliance."	
Current SDWIS Code	**Description**	**Examples of States Actions**
None – closest in SFK or EFK	St or Fed BCA signed (if does not meet "Formal" definition)	
SFJ or EFJ	St or Fed Formal NOV issued	Violation Notice; Notice of Violation (NOV);
SO6 or EO6 for violation types not specified in resolving list	St or Fed Intentional no-action	
None – propose new code SIU	Referral to U.S. EPA	
None – propose new code SIT or EIT	Treatment Installed	
SF2 or EF2	Referred for Higher St or Fed Level Review	
SFH or EFH	St or Fed Boil Water Order	
SF3	St Case appealed	
SF4	St Case dropped	
SFP	St Civil Case under development	
SIB or EIB	St or Fed Compliance Meeting conducted	
SFS or EFS	St or Fed Default Judgment	
SF5	St Hook-up/Extension Ban	
SFT or EFT	St or Fed Injunction	
SO+ or EO+	St or Fed no additional Formal Action needed	
SO8 or EO8	St or Fed Other	
SFG or EFG	St or Fed Public Notification issued	
SIF or EIF	St or Fed Public Notification received	
SIE or EIE	St or Fed Public Notification requested	
SFN or EFN	St or Fed Show-cause Hearing	
SID or EID	St or Fed Site Visit (enforcement)	
SIC or EIC	St or Fed Tech Assistance Visit	
SFU or EFU	St or Fed Temp Retrain Order/Prelim Injunction	
SOZ or EOZ	St or Fed Turbidity Waiver issued	
SO7 or EO7	St or Fed Unresolved	
SOY or EOY	St or Fed Variance/Exemption issued	
SIA or EIA	St or Fed Violation/Reminder Notice	
SII or EII	St or Fed CCR Follow-up Notice	

APPENDIX

In an effort to analyze the influence of a population factor on the outcome of the system's ranking, the States and EPA Regions should calculate the results using the following formula. The results should then be compared to the results of the non population-based formula.

The alternative formula would calculate a point score for each drinking water system using this formula:

Alternate Formula:
Sum (S*T*P) + n

Where:

S and n = use the definitions on page 4

T = water system type factor

2	CWS, NTNCWS
1	TNCWS

P = retail population served factor

1	Very small	(less than 501)
1.5	Small	(501-3,300)
2	Medium	(3,301-10,000)
2.5	Large	(10,001-100,000)
3	Very large	(100,001...)

Approaches for Setting Drinking Water Standards for Groups of Carcinogenic Volatile Organic Compounds (cVOCs)

Presenter: Lisa Christ, Chief
U.S. EPA, Office of Ground Water and Drinking Water, Standards and Risk Management Division, Targeting and Analysis Branch

Purpose

- Present approaches for developing a maximum contaminant level (MCL) for a group of contaminants
- Obtain feedback on two approaches for a group MCL

Overview

- Why develop group maximum contaminant level (MCL) approaches
- The carcinogenic volatile organic compound group (cVOC)
- Safe Drinking Water Act considerations
- Two approaches
  - Group MCL development
  - MCL compliance
  - Advantages and disadvantages

Why is EPA Looking at Group MCL Approach

2010
- Drinking Water Strategy announced

2011
- cVOC regulation announced

2013
- EPA initiates development of group MCL approaches

Group Characteristics for cVOCs

- All **carcinogens** (presume all MCLGs would be zero)
  - Cancer, but different target organs
- **No health interactions** at levels found in drinking water
  - Cancer risks are additive
- **Co-occurrence** is possible
- **Treatment** can remove all cVOCs, but effectiveness can vary
- **Common analytical** method

Group MCL Framework - Guiding Principles

- Comply with the requirements of SDWA
- Efficiently accounts for risks of exposure to multiple contaminants in one regulation
- Provide water systems with an opportunity to make the best long- term decisions on capital investments
- Allows for future changes in health information or analytical methods capabilities to be incorporated in the group MCL
- Provides a framework for EPA to address emerging contaminants in the future
- Consistent methods for developing a group MCL for future regulations

Safe Drinking Water Act establishes criteria for MCL development

1.Set maximum contaminant level goal (MCLG) based on health risk

2. Set MCL as close to MCLG as feasible

- Analytical feasibility
- Treatment feasiblity

3. However, can set MCL at higher level if benefits don’t justify costs at feasible level

Based on the SDWA criteria, EPA developed two approaches

Group MCL must meet SDWA requirement to set MCL as close to MCLG as feasible

Approach 1: based on feasible level addition

Approach 2: based on risk-weighted feasible level addition

Two Group MCL Approaches

- Approach 1: Analytical Feasible Level Addition
  - MCL is based on concentration
- Approach 2: Risk-Weighted Feasible Level Addition
  - MCL is based on risk

Illustrations Based on Simple Group of Three cVOCs

VOC	MRL (µg/L)	Unit Risk $(\frac{1}{\mu g/L})$
1,2,3-Trichloropropane	0.03	2.29×10^{-3}
Vinyl chloride	0.056	4.20×10^{-5}
Trichloroethylene	0.021	2.00×10^{-6}

Approach 1: Feasible Level Addition

- Feasible level for carcinogens
  - Setting the MCL as close as feasible to MCLG is limited by analytical method quantitation level [i.e. minimum reporting level (MRL)]
- The group MCL is derived by adding the MRLs for each member of the group
  - The group MCL is the total of all MRLS

Example: Feasible Level Addition Group MCL

VOC	MRL (µg/L)	Unit Risk $\left(\frac{1}{\mu g/L}\right)$
1,2,3-Trichloropropane	0.03	2.29×10^{-3}
Vinyl chloride	0.056	4.20×10^{-5}
Trichloroethylene	0.021	2.00×10^{-6}
Group MCL	**0.107**	

Compliance Determination

- Systems collect sample; the measured concentration for each cVOC are added.
- The total of all concentrations are compared to the group MCL.

Example: Compliance Determination for Approach 1 at Three Hypothetical Systems

cVOC	System 1 Conc. (ug/L)	System 2 Conc. (ug/L)	System 3 Conc. (ug/L)
1,2,3-Trichloropropane	0	0.03	0.09
Vinyl chloride	0.1	0	0
Trichloroethylene	0.2	0.03	0
Sum	**0.3**	**0.06**	**0.09**

Exceeds group MCL of 0.107 ug/L

Feasible Level Addition

Advantages

– Straight-forward and easy to implement.

– Compliance determination equation is not difficult.

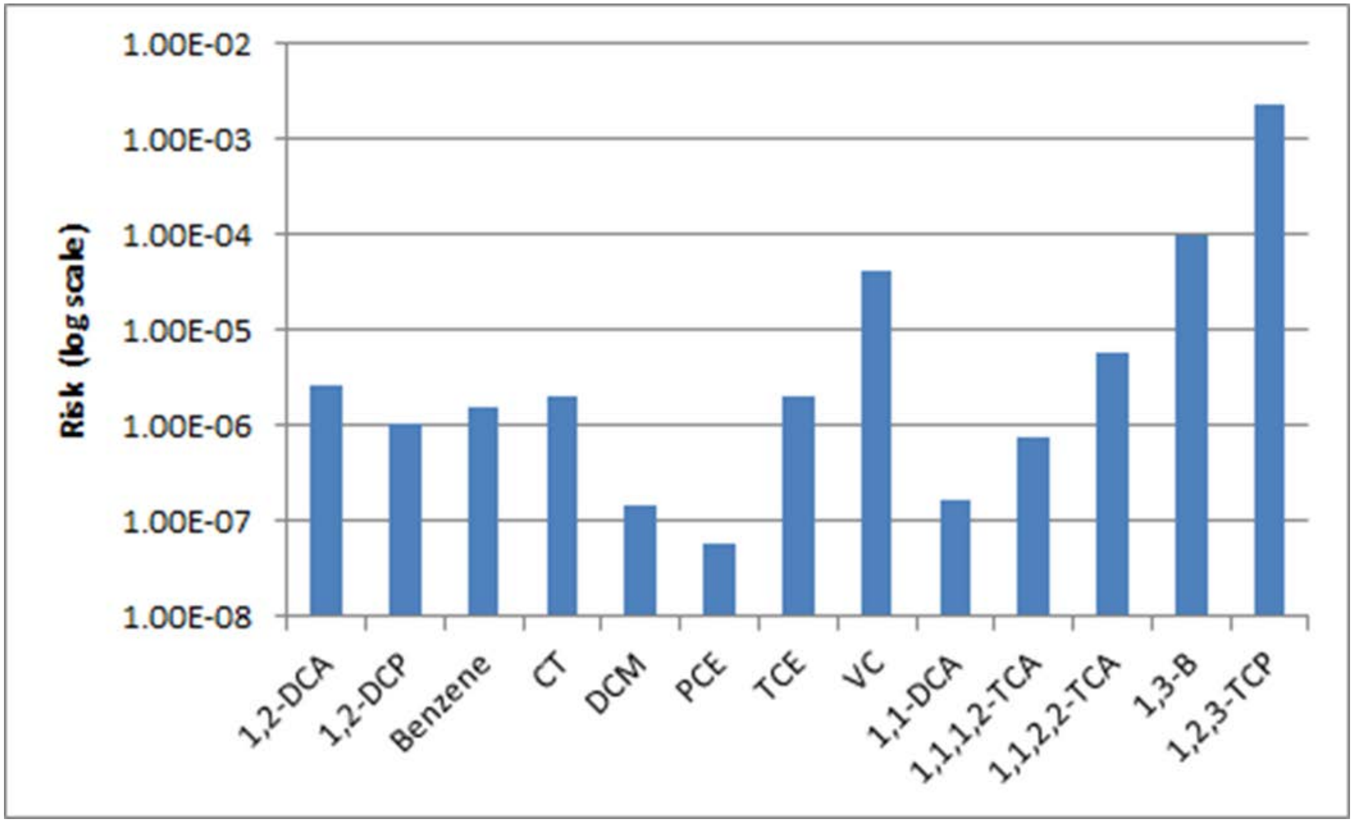
Disadvantages

– Doesn’t take into account health risk variation between cVOCs.

– May require systems to install treatment for less risky members of the group resulting in minimal health benefit.

– Effects of adding emerging VOCs may change the group MCL.

Unit Risk (per ug/L) Variation



Approach 2: Risk-Weighted Feasible Level Addition

- Multiply the MRLs for each cVOC by its unit risk and total these values
  - Results in an overall risk level for the group that cannot be exceeded
- To provide a risk "weight" for each cVOC
  - The unit risk is divided by the total risk to derive the risk "weight"

Example: Risk-Weighted Feasible Level Addition Group MCL

VOC	MRL (µg/L)	Unit Risk ($\frac{1}{\mu g/L}$)	Risk-Weighted Feasible Level (unitless)
1,2,3-Trichloropropane	0.03	2.29×10^{-3}	6.87×10^{-5}
Vinyl chloride	0.056	4.20×10^{-5}	2.35×10^{-6}
Trichloroethylene	0.021	2.00×10^{-6}	4.20×10^{-8}
Group MCL (aggregate risk at feasible level)			7.11×10^{-5}

Example: Risk-Weighted Feasible Level Addition Group MCL

Risk-Weights (unit risk divided by total risk weight feasible level):

1,2,3-Trichloropropane: $2.29 \times 10^{-3} / 7.11 \times 10^{-5} =$ 32.2

Vinyl chloride: $4.20 \times 10^{-5} / 7.11 \times 10^{-5} =$ 0.59

Trichloroethylene: $2.00 \times 10^{-6} / 7.11 \times 10^{-5} =$ 0.028

The resulting group MCL is a unitless value of 1.

Compliance Determination

- Systems collect sample; the measured concentration for each cVOC are multiplied by its risk “weight”
- The total of all concentrations times its risk weight are compared to the group MCL.
- EPA would provide the risk “weights” for compliance determination purposes

Example: Compliance Determination for Approach 2

VOC	System 1 (Contaminant Conc. ug/L)	Risk Weights	Risk-Weighted level (Conc. X Risk Weights)
1,2,3-Trichloropropane	0	32.2	0
Vinyl chloride	0.1	0.59	0.059
Trichloroethylene	0.2	0.028	0.0056
Risk-Weighted Sum			**0.0646**

Less than the group MCL of 1

Compliance Determination for Approach 2 at Three Hypothetical Systems

VOC	System 1 Conc. (ug/L)	System 2 Conc. (ug/L)	System 3 Conc. (ug/L)
1,2,3-Trichloropropane [risk weight 32.2]	0	0.03	0.09
Vinyl chloride [risk weight 0.59]	0.1	0	0
Trichloroethylene [risk weight 0.028]	0.2	0.03	0.0
Risk-Weighted Sum [concentration x risk weight]	**0.0646**	**0.97**	$\boxed{\textbf{2.9}}$

Exceeds group MCL of 1

Risk-Weighted Feasible Level Addition

Advantages

- Accounts for risks variation across a group of contaminants with unit risks that vary by several orders of magnitude
- Will not impose undue burden on systems that do not offer much by way of health risk reduction
- Systems that exceed the group MCL install treatment to reduce the riskiest contaminant(s) in the group

Disadvantages

- Unusual approach (but similar to radionuclide beta emitters)
- Changes in cancer slope factors may change the group MCL
- New cVOCs added to the group in the future may change the group MCL

Compliance Determination Comparison of Approaches

Approach 1

cVOC	System 1 Conc. (ug/L)	System 2 Conc. (ug/L)	System 3 Conc. (ug/L)
1,2,3-Trichloropropane	0	0.03	0.09
Vinyl chloride	0.1	0	0
Trichloroethylene	0.2	0.03	0
Sum	**0.3**	**0.06**	**0.09**

Approach 2

VOC	System 1 Conc. (ug/L)	System 2 Conc. (ug/L)	System 3 Conc. (ug/L)
1,2,3-Trichloropropane [risk weight 32.2]	0	0.03	0.09
Vinyl chloride [risk weight 0.59]	0.1	0	0
Trichloroethylene [risk weight 0.028]	0.2	0.03	0.0
Risk-Weighted Sum [concentration x risk	**0.0646**	**0.97**	**2.9**

Simple Cost-Benefit Comparison for Approaches

Item	Feasible Level Addition	Risk-Weighted Feasible Level Addition
Compliance Action	Systems 2 & 3 – **no action** System 1 uses PTA to remove combined TCE and VC to less than 0.107 ug/L	Systems 1 & 2 – **no action** System 3 uses GAC to target 1,2,3-TCP so risk-weighted sum is less than 1
Annual Costs	**$268,000**	**$450,000**
Annual Benefits	**$11,000**	**$526,000**

For estimating cost & benefits, EPA assumed that systems 1,2, & 3 serve ~21,000 people
PTA: Packed Tower Aeration; GAC: Granular Activated Carbon

Comparison of Approaches

Factor	Feasible Level Addition	Risk-Weighted Feasible Level Addition
Ease of implementation	More familiar MCL and compliance equation (TTHMs, HAA5s)	MCL and compliance equation require more effort, but is simpler than beta rule
Cost effectiveness	Encourages cost-effective reduction in contaminant **levels**	Encourages cost-effective reduction in contaminant **risk**
Risk reduction	Less targeted	More targeted

Questions

Appendix: Current list of cVOCs being considered for Group Regulation

Regulated cVOCs	Unregulated cVOCs
1,2-Dichloroethane (Ethylene Dichloride) (107-06-2)	1,1-Dichloroethane (75-34-3)
1,2-Dichloropropane (78-87-5)	1,2,3-Trichloropropane (96-18-4)
Benzene (71-43-2)	1,3-Butadiene (106-99-0)
Carbon Tetrachloride (56-23-5)	**5 removed from original list**
Dichloromethane (Methylene Chloride) (75-09-2)	~~Aniline~~
Tetrachloroethylene (PCE) (127-18-4)	~~Benzyl Chloride~~
Trichloroethylene (TCE) (79-01-6)	~~Nitrobenzene~~
Vinyl chloride (75-01-4)	~~Oxirane, methyl-~~
	~~Urethane~~
	2 additional under consideration
	1,1,1,2-Tetrachloroethane (630-20-6)
	1,1,2,2-Tetrachloroethane (79-34-5)

Method for Deriving a Group MCL

Draft

October 28, 2014

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1. Introduction

This paper presents the approach that the U.S. Environmental Protection Agency (EPA or the Agency) developed for establishing a single maximum contaminant level (MCL) for a group of drinking water contaminants. The approach, which incorporates health risk values, is applicable for a group of contaminants that cause a variety of cancers.

Following a background discussion (Section 1.1), this paper notes that there are various types of group MCLs in use (Section 2.1), and presents two general approaches that reflect current practices (Section 2.2). The presentation includes a hypothetical example to illustrate the approaches to demonstrate the advantages and disadvantages of each approach. In Section 3, EPA provides a summary of the advantages and disadvantages of the two approaches and a rationale for its selection of a preferred approach (Section 3).

1.1 Background

This background section provides the context for the analysis of approaches to a group MCL. First, it provides an outline of the requirements for an MCL under the Safe Drinking Water Act (SDWA). Then, it has a brief description of the group rule strategy, which is the motivation for the analysis.

A MCL is the maximum level of a contaminant that EPA allows in drinking water to protect human health [SDWA §1401 (3)]. The SDWA requires that EPA regulate the level of a contaminant in drinking water through a national primary drinking water regulation (NPDWR). EPA must first identify a maximum contaminant level goal (MCLG) for a contaminant, which is not enforceable. Then EPA must establish the MCL, which is an enforceable standard.

SDWA §1412 (b)(4)(A) requires that EPA set the MCLG at the level at which no known or anticipated adverse effects on the health of persons occur while providing an adequate margin of safety. EPA generally sets the MCLG for a carcinogen equal to zero if the Agency does not identify a non-linear mode of action (i.e., if there is no evidence that there is a safe threshold quantity below which there are no cancer risks). EPA bases the MCLG for noncarcinogens on a reference dose (RfD).[1]

EPA must consider multiple criteria when setting an enforceable MCL. First, SDWA §1412 (b)(4)(B) requires EPA to specify an MCL which is as close to the MCLG as is feasible. SDWA §1412(b)(4)(D) defines feasible to mean with the use of the best technology, treatment techniques, and other means which EPA finds to be available, after considering efficacy under field conditions, and cost. SDWA §1412 (b)(6)(A), however, gives the EPA Administrator the discretion to set an MCL at a higher value if the benefits do not justify the costs of an MCL at the feasible level.

In 2010, EPA announced a new strategy of regulating drinking water contaminants in groups, to speed progress towards addressing unregulated contaminants as well as taking advantage of available treatment technologies that address several contaminants at once (EPA, 2010). The Agency

[1] EPA's Integrated Risk Information System (IRIS) defines an RfD as: An estimate of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime.

considered several factors in evaluating which contaminants might effectively be regulated as a group, including whether the contaminants in the group: (a) cause similar adverse health endpoints, (b) can be measured using the same analytical methods, (c) can be removed from water using the same technology or treatment technique approach and/or (d) potentially co-occur. Stakeholders generally agreed that these are some of the more important factors to consider in evaluating which contaminants to include in a group regulation.

Pursuant to this strategy, EPA is evaluating optional approaches for setting a single MCL – in lieu of multiple MCLs – for a group of contaminants. EPA seeks to identify an approach that meets the SDWA requirements for setting an MCL. Although EPA regulated most drinking water contaminants individually, it established group MCLs for a few: disinfection byproducts [total trihalomethanes (TTHM) and five haloacetic acids (HAA5)], and radionuclides (alpha emitters and beta emitters). Thus, the group MCL concept is not entirely new to drinking water regulations. EPA does not, however, have a formal approach to setting a group MCL. If future regulatory efforts will focus opportunities to develop group MCLs, a formal approach will facilitate NPDWR development.

2. Group MCL Approaches

The section begins with brief descriptions of group MCLs among the existing NPDWRs. Next, this section provides general descriptions for two alternative approaches to establishing group MCLs. It also provides a hypothetical contaminant group for illustration purposes.

2.1 Existing Group MCLs

The first type of group MCL relates to the sum of contaminant concentrations. EPA uses two of these group MCLs to regulate disinfection byproducts. The TTHM MCL of 0.08 milligrams per liter (mg/L) applies to the sum of measured concentrations of chloroform, bromodichloromethane, dibromochloromethane, and bromoform; the HAA5 MCL of 0.06 mg/L applies to the sum of measured concentrations of mono-, di-, and trichloroacetic acids, and mono- and dibromoacetic acids (EPA, 1998). Appendix A provides the MCLGs for individual contaminants as well as the TTHM and HAA5 MCLs.

The second type of group MCL pertains to the sum of the risk-weighted contaminant concentrations. EPA uses this approach to regulate over 170 emitters of beta particle and photon radioactivity with a single MCL. The risk-weighted sum of beta and photon emitter measurements cannot exceed an effective dose of 4 millirems per year (mrem /yr) (40 CFR 141.66(d)(2)), which corresponds to a 10^{-4} lifetime cancer risk (EPA, 1991). Thus, the MCL is essentially a limit on the allowable level of risk across a contaminant group.

The radionuclide rule establishes a "sum-of-the-fractions" equation for compliance (40 CFR 141.66(d)). Appendix B provides the equation and an example of use. The equation contains a risk-based multiplier for each radionuclide. The multiplier is based on the cancer risk that each radionuclide poses. Thus, radionuclides that pose greater health risk will have greater multipliers or more weight in what is essentially a risk-weighted concentration sum.

2.2 Two Approaches to Setting a Group MCL

Although EPA has regulated some drinking water contaminants using a group approach, it has promulgated individual MCLs for most contaminants. As part of the effort to fulfill its 2010 Drinking Water Strategy, EPA evaluated alternative approaches for setting a group MCL. EPA sought an approach that satisfies the SDWA requirement that EPA set an MCL as close to the MCLG as feasible to maximize health risk reductions.

In 2011, EPA announced that the initial group under consideration would be carcinogenic volatile organic compounds (cVOCs) (EPA, 2011). The rationale for considering these contaminants as a group is: a) the MCLG for each cVOC is currently or would likely be set at zero because they are carcinogens; b) they can be measured by the same analytical methods (e.g., EPA Method 524.3); c) many can be treated using the same treatment processes (i.e., aeration and/or granular activated carbon); and d) some may co-occur. In addition, there are variations in target organs and EPA knows of no antagonistic or synergistic effects of mixtures at the concentration levels observed in drinking water. Therefore, EPA has determined that cVOC health effects are independent for the purpose of deriving a group MCL. According to EPA guidance for addressing the health risks of chemical mixtures (EPA, 1999; EPA 2000b), this independence means that the health risks for cVOCs are additive.

For this paper, the characteristics of the cVOC group provide a relatively simple example to illustrate the approaches for a developing a group cVOC MCL. To keep the illustration straightforward yet informative, EPA selected a small subset of three contaminants with ingestion unit risks (in units of risk per microgram per liter, µg/L) that span three orders of magnitude. Exhibit 2-1 shows the contaminants along with ingestion unit risk values and quantitation limits or minimal reporting levels (MRLs). The MRLs are the lowest feasible MCL for each individual contaminant.[2] Applicable treatment technologies can remove the contaminants to below their respective MRLs, although optimal treatment varies across the contaminants. Finally, these contaminants are known to co-occur, which means system populations can be exposed to a variety of mixtures.

Exhibit 2-1. Illustrative Carcinogenic Contaminant Group

Contaminant	Unit Risk $(\mu g/L)^{-1}$	MRL (µg/L)
1,2,3-Trichloropropane	2.29×10^{-3}	0.030
Vinyl chloride	4.20×10^{-5}	0.056
Trichloroethylene	2.00×10^{-6}	0.021

µg/L = micrograms per liter
Note that the values in this table are for illustration, and are subject to changes in underlying data. For the illustration, also suppose that there is no MCL for either vinyl chloride or trichloroethylene.

2.2.1 Addition of Feasible Concentrations

One approach to establishing a group MCL is to set it equal to the sum of the MRLs for the contaminants in the group. This section provides a general description of the approach, followed by an illustration of the approach based on the cVOC group in Exhibit 2-1. Next, this section provides a discussion of how systems will determine compliance with the MCL and provides an illustration using hypothetical cVOC concentrations for three systems. Although the concentrations are hypothetical, they represent realistic levels for drinking water systems.

Establishing the MCL

For a general case, let MRL_i be the MRL for the contaminant i, where i = 1 to I. The group MCL formula is:

$$MCL = \sum_{i=1}^{I} MRL_i.$$

[2] In the context of drinking water regulations, an MRL for a chemical is an estimate of a lowest concentration minimum reporting level (LCMRL) that is achievable, with 95% confidence, by a capable analyst/laboratory at least 75% of the time using a specified analytical method. An LCMRL is the lowest spiking concentration at which recovery of between 50% and 150% is expected 99% of the time by a single analyst. (76 Federal Register 11713, March 3, 2011)

For each contaminant, the MRL represents the lowest feasible level for an individual MCL. Because of laboratory limitations, the MRL is the closest that an individual MCL can be to the MCLG of zero.[3] Because the group MCL is equal to the sum of the MRL values, it is the lowest feasible limit for aggregate exposure across the contaminants that regulation can achieve.

Exhibit 2-2 shows the MRL values for the example of a group of three cVOCs. In this example, the group MCL would be 0.107 µg/L.

Exhibit 2-2. Derivation of Group MCL based on Feasible Level Addition Approach

Contaminant	MRL (µg/L)
1,2,3-Trichloropropane	0.030
Vinyl chloride	0.056
Trichloroethylene	0.021
Group MCL (sum of 3 MRLs)	**0.107**

MCL = maximum contaminant level
MRL = minimum reporting level

Determining Compliance

To determine compliance with an MCL for an individual contaminant, a drinking water system obtains a measurement of the level of the contaminant in its treated water. If the measurement is less than or equal to the MCL, then the system is in compliance. If, however, the measurement exceeds the MCL, then the system is not in compliance.

This same approach applies to a group MCL. For a group MCL based on the sum of feasible limits, if the sum of the measured concentrations across the group of contaminants is less than or equal to the group MCL, then the system is in compliance. Let C_i be the measured concentration of contaminant i.[4] Compliance with the group MCL requires:

$$MCL \geq \sum_{i=1}^{I} C_i.$$

To illustrate compliance determination for the cVOC example, suppose three systems have hypothetical measured concentrations. Exhibit 2-3 shows these measurements for each cVOC. It also shows the concentration sum at each system. The sum for System 1 is 0.30 µg/L; the sum for System 2 is 0.06 µg/L; and the sum for System 3 equals 0.09 µg/L. Only System 1 exceeds the example group MCL of 0.107 µg/L.

[3] If the feasible treatment level is higher than the MRL, then the feasible treatment level is a lower bound on the MCL. To generalize the MCL formula, the values in the sum are the maximum of the MRL or treatment level for each contaminant.

[4] Per 40 CFR 141.23(i)(1), if a contaminant is not present at a level equal to or greater than the MRL, then C_i is zero.

Exhibit 2-3. Example Monitoring Results and Compliance Determination for Three Systems*

Concentration (µg/L)	System 1	System 2	System 3
1,2,3-Trichloropropane	0.00	0.03	0.09
Vinyl chloride	0.10	0.00	0.00
Trichloroethylene	0.20	0.03	0.00
Sum	0.30	0.06	0.09
Does the sum exceed the MCL (0.107 µg/L)?	Yes	No	No

MCL = maximum contaminant level
µg/L = micrograms per liter
* In monitoring compliance, systems set measurements for which there is no detectable quantity equal to zero [see 40 CFR 141.23(i)(1)].

To achieve compliance, System 1 needs to reduce the sum of the contaminants detected by 0.193 µg/L (i.e., 0.3 – 0.107). Exhibit 2-4 shows two potential compliance solutions. The first compliance solution illustrates the effect of a granular activated carbon (GAC) treatment process, which would mainly reduce trichloroethylene levels. To achieve compliance, the GAC process would have to reduce trichloroethylene to below the MRL of 0.021 µg/L. The second compliance solution shows the effect of an aeration process. This process would most likely remove vinyl chloride to below detection because vinyl chloride is very volatile and easy to remove from water. Aeration would also reduce trichloroethylene. For compliance purposes, the aeration process can reduce both vinyl chloride and trichloroethylene by any combination of amounts that sum to 0.193 µg/L.

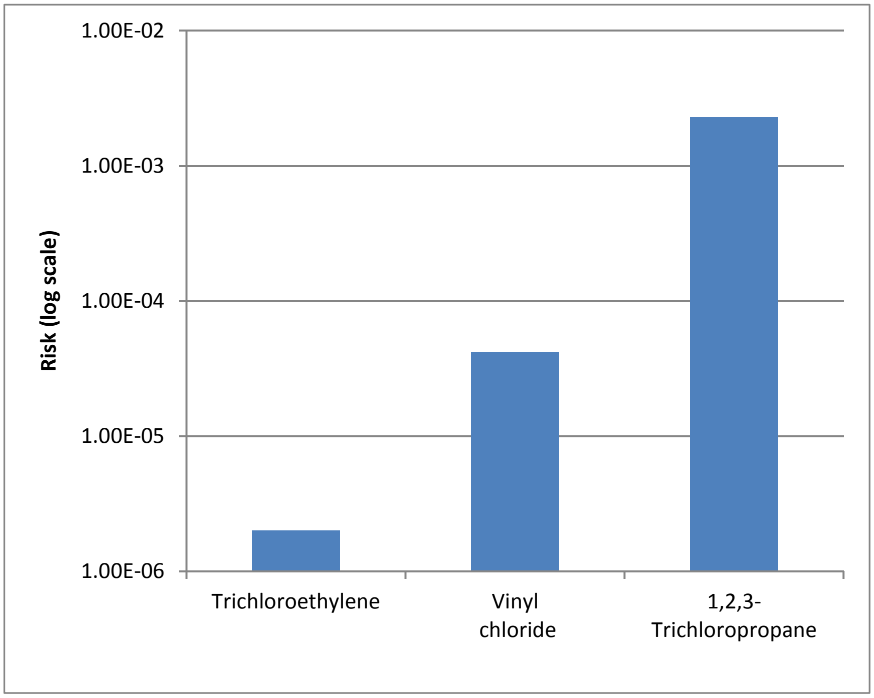
Exhibit 2-4. Illustrative Compliance for System 1 with Group MCL

Contaminant	Baseline Concentration (µg/L)	Compliance Solution 1 GAC Concentration (µg/L)	Compliance Solution 1 GAC Reduction	Compliance Solution 2 Aeration Concentrati on (µg/L)	Compliance Solution 2 Aeration Reduction
1,2,3-Trichloropropane	0.00	0.00	NA	0.00	NA
Vinyl chloride	0.10	0.10	0%	0.00	>44%*
Trichloroethylene	0.20	0.00	>90%**	0.10	50%
Sum	0.30	0.10	NA	0.10	NA
Does the sum exceed the MCL (0.107 µg/L)?	Yes	No	NA	No	NA

MCL = maximum contaminant level;
µg/L = micrograms per liter
* The percent reduction is greater than 44% because a reduction from the baseline concentration of 0.10 µg/L to the MRL of 0.056 µg/L is a reduction of 44% from baseline, but the actual reduction is to some unknown level below the MRL. Because trichloroethylene must also be reduced by 50% to achieve compliance, an aeration design to remove approximately 70% of vinyl chloride would also achieve the necessary trichloroethylene removal.
** The percent reduction is greater than 90% because a reduction from the baseline concentration of 0.20 µg/L to the MRL of 0.021 µg/L is a reduction of 90% from baseline, but the actual reduction is to some unknown level below the MRL.

System 1 can choose the compliance solution that achieves the MCL at the lowest cost without regard to whether it maximizes health risk reduction. Exhibit 2-5 shows the relative unit risks of the three VOCs. Based on relative risks, the aeration compliance option that reduces vinyl chloride will have greater health benefits than the GAC option that reduces trichloroethylene. If, however, the GAC process is the least-cost option, then System 1 can choose the GAC process over the aeration process to meet the group MCL based on feasible level addition.

Exhibit 2-5. Unit Risks for Three Volatile Organic Compounds



2.2.2 Addition of Feasible Level Risks

To develop a group MCL that takes into account the risk variability across group constituents, EPA identified an approach that incorporates the relative risk of each contaminant in the group. For this approach, the group MCL is the sum of the contaminant risks at the MRL.

Establishing the MCL

The first step in this approach is to estimate the risk of each contaminant in the group:

$$R_i = U_i \times MRL_i.$$

where:

R_i = risk for contaminant i at a given concentration

U_i = drinking water unit risk for contaminant i, in µg/L^{-1}

MRL_i = minimum reporting level for contaminant i, in µg/L.

The next step is to sum the risks across all contaminants in the group to derive the MCL:

$$MCL = R_1 + R_2 + R_3 + \ldots R_I.$$

Substituting for the R_i values, the equation becomes:

$$MCL = U_1 \times MRL_1 + \ldots + U_I \times MRL_I.$$

Exhibit 2-6 illustrates this approach for the three cVOCs.

Exhibit 2-6. Derivation of Group MCL Based on Feasible Level Risk Addition Approach

Contaminant	Unit Risk $(\mu g/L)^{-1}$	MRL (µg/L)	Risk at Feasible Level (unit less)
1,2,3-Trichloropropane	2.29×10^{-3}	0.030	6.87×10^{-5}
Vinyl chloride	4.20×10^{-5}	0.056	2.35×10^{-6}
Trichloroethylene	2.00×10^{-6}	0.021	4.20×10^{-8}
Group MCL (aggregate risk at feasible levels)			7.11×10^{-5}

µg/L = micrograms per liter

For the example in Exhibit 2-6, the group MCL is 7.11×10^{-5}. The MCL is unit less instead of having the mass-per-volume units of concentration-based MCLs.

The risk-weighted MCL formula is similar to the health risk assessment concept of response addition. A response addition equation can be used to estimate the risk of a mixture of contaminants that pose independent health risks (EPA, 1999; EPA, 2000b).[5] When the contaminants in a group pose independent health risks, the risk-weighted MCL formula can also be interpreted as a reasonable approximation to the aggregate risk of cancer from a mixture of the contaminants at the MRL values.

Determining Compliance

To determine compliance with a risk-weighted MCL, systems would measure the concentrations (C_i) of all contaminants in the group, multiply each concentration by the corresponding unit risk, sum the results across contaminants, and compare to the MCL:

$$MCL \geq U_1 \times C_1 + \cdots + U_I \times C_I.$$

[5] The approach also reflects an assumption that the probabilities are small enough that all possible joint probabilities are insignificant, which can be a reasonable assumption given very small incremental cancer risks. Consider a simple example of two independent events X and Y, where p(X) is the probability that event X occurs and p(Y) is the probability that event Y occurs. The aggregate probability of either event X or Y occurring is: $p(X \cup Y) = p(X) + p(Y) - p(X \cap Y)$, where the latter term is the joint probability that is double counted in the simple sum of the two probabilities. When the two event probabilities are very small, however, the joint probability can be treated as inconsequential. Suppose that p(X) is 2×10^{-5} and p(Y) 2×10^{-6}. The probability is: $2 \times 10^{-5} + 2 \times 10^{-6} - (2 \times 10^{-5} \times 2 \times 10^{-6}) = 2.2 \times 10^{-5} - 4 \times 10^{-11} \approx 2.2 \times 10^{-5}$.

To simplify the compliance equation, it is possible to divide both sides by the group MCL:

$$MCL \times \left(\frac{1}{MCL}\right) \geq \left(\frac{1}{MCL}\right) \times (U_1 \times C_1 + \cdots + U_I \times C_I).$$

$$1 \geq \left(\frac{U_1}{MCL}\right) \times C_1 + \cdots + \left(\frac{U_I}{MCL}\right) \times C_I.$$

Given this transformation, let W_i be the risk weight equal to U_i divided by the group MCL. The simplified compliance equation is:

$$1 \geq W_1 \times C_1 + \cdots + W_I \times C_I.$$

Exhibit 2-7 illustrates the calculation of risk for the three contaminants at the measured concentrations at hypothetical System 1 in Exhibit 2-3.

Exhibit 2-7. Calculation of Risk for System 1

Contaminant	Risk Weight* $(\mu g/L)^{-1}$	Concentration (µg/L)	Risk-Weighted Level** (unit less)
1,2,3-Trichloropropane	32.2	0.00	0.00
Vinyl chloride	0.591	0.10	0.0591
Trichloroethylene	0.0281	0.20	0.00563
Risk-weighted sum			0.0647

µg/L = micrograms per liter
* Each risk weight equals unit risk divided by the aggregate risk of 7.11×10^{-5}.
** Risk weight multiplied by concentration. Detail may not add to total due to independent rounding.

Exhibit 2-8 shows the risk-weighted sums for all three hypothetical systems. Given the simplified group MCL of 1.0, systems 1 and 2 are in compliance. System 3, however, is out of compliance because of the high risk associated with 1,2,3-trichloropropane. System 3 can achieve compliance only by reducing 1,2,3-trichloropropane; if it had co-occurring trichloroethylene, reductions in trichloroethylene would have no significant effect on the compliance equation. System 3 can use either GAC or aeration to achieve approximately a two-thirds reduction in 1,2,3-trichloropropane to achieve compliance (i.e., essentially to the MRL value). It can choose a treatment option that is cost-effective.

Exhibit 2-8. Compliance Determination for Risk-Weighted Group MCL*

Contaminant	System 1	System 2	System 3
1,2,3-Trichloropropane (risk-weighted level)	0.0	0.966	2.90
Vinyl chloride (risk-weighted level)	0.0591	0.0	0.00
Trichloroethylene (risk-weighted level)	0.00563	0.000844	0.00
Risk-Weighted Sum	0.0647	0.967	2.90
Does the sum exceed the MCL (simplified to 1.0)?	No	No	Yes

MCL = maximum contaminant level

* Values are based on the concentrations in Exhibit 2-3 and the risk weights in Exhibit 2-8Exhibit 2-7. Consistent with compliance monitoring practice, systems set measurements that do not have a detection result equal to zero.

3. Advantages and Disadvantages of the Group MCL

This section provides a comparison of the advantages and disadvantages of the two group MCL approaches. Topics addressed include ease of implementation, cost effectiveness, and health risk reduction.

Both approaches provide opportunities to select a single cost-effective compliance solution across a group of contaminants. For the feasible level addition approach, a system can choose the most cost-effective solution to meet an aggregate contaminant concentration. For the risk-weighted approach, a system can choose the most cost-effective solution to meet an aggregate risk or risk-weighted sum. As the example showed, the compliance results may vary dramatically across the two group MCL approaches. Under the feasible level approach, System 1 needed treatment to remove trichloroethylene and/or vinyl chloride to achieve compliance with the group MCL, but Systems 2 and 3 were in compliance. Under the risk-weighted approach, however, System 1 met the group MCL whereas System 3 did not because of a high 1,2,3-trichloropropane level.

The feasible level addition approach in Section 2.2.1 has the advantage of being more straightforward than the risk-weighted approach in Section 0. Many systems already have experience using contaminant concentration sums to determine compliance with the TTHM and HAA5 MCLs. By comparison, the risk-weighted approach involves more calculations to determine compliance. Systems or laboratories would need to calculate risk-weighted sums of monitoring results. Although this calculation would be an additional step, the beta emitter rule establishes precedence for manipulating concentrations to determine compliance.

A disadvantage of the feasible level addition approach is that it is less able to maximize health risk reduction compared to the risk-weighted approach. As the hypothetical example in Exhibit 2-3 shows, compliance with the feasible level addition approach would require System 1 to reduce trichloroethylene, which is the least potent contaminant of the group. Conversely, Exhibit 2-8 shows the risk-weighted approach results in compliance efforts at the system having a mixture with higher risks. Based on the risk-weighted sums, System 1 has the lowest overall risk despite having the highest aggregate concentration, and System 3 has a substantially more potent mixture that violates the risk-weighted MCL despite being in compliance with the group MCL based on feasible level addition. Thus, this example demonstrates that the risk-weighted approach to setting a group MCL is the better of the two approaches for minimizing overall risk and targeting compliance efforts to reduce exposure to contaminants with the highest health risk.

Exhibit 3-1 contains a summary of the advantages and disadvantages. Based on a review of advantages and disadvantages, EPA determined that the risk-weighted approach is appropriate for future group MCLs for groups such as cVOCs that meet the criteria listed in Section 2: all carcinogens for which the MCLG is zero, and health risks are independent. These contaminants can occur in mixtures, and the analytical methods or treatment options are also similar. EPA will evaluate risk-based group MCL approaches for groups with different characteristics at a later time.

Exhibit 3-1. Summary of Advantages and Disadvantages of the Group MCL Approaches

Topic	Feasible Level Addition	Risk-Weighted
Cost effectiveness	Encourages cost-effective reduction in contaminant levels	Encourages cost-effective reduction in contaminant risk
Ease of implementation	More familiar MCL and compliance equation	MCL and compliance equation require more effort, but simpler than beta rule
Risk reduction	Less targeted	More targeted

The risk-weighted approach has the potential to provide better risk management compared to the approach of feasible level addition. As the hypothetical example shows, the risk-weighted approach focuses compliance actions on the mixtures that pose higher health risks. Furthermore, it provides systems with an incentive to adopt compliance strategies that target reductions in the riskiest contaminants. Thus, the approach may result in more cost-effective investments in control technologies in terms of cost per incremental health risk reduction. EPA believes that the improvement in risk management outweighs the additional complexity of incorporating risk weights.

4. References

National Bureau of Standards (NBS). 1963. *Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air or Water for Occupational Exposure*. U.S. Department of Commerce. Handbook 69 as amended August 1963.

U.S. Environmental Protection Agency (EPA). 2011. *Basic Questions and Answers for the Drinking Water Strategy Contaminant Groups Effort*. Office of Water. EPA 815-F-11-002. January.

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---------. 2000a. *Radionuclides Notice of Data Availability Technical Support Document*. Prepared by Office of Ground Water and Drinking Water in collaboration with Office of Indoor Air and Radiation, and United States Geological Survey. March.

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---------. 1999. *Guidance for Conducting Health Risk Assessment of Chemical Mixtures*. NCEA-C-0148. April.

---------. 1998. National Primary Drinking Water Regulations: Disinfectants and Disinfection Byproduct. 63 *Federal Register* 69390, December 16, 1998.

---------. 1991. National Primary Drinking Water Regulations: Radionuclides; Notice of Proposed Rulemaking. 56 *Federal Register* 33050, July 18, 1991.

Appendix A: MCLs and MCLGs for TTHM and HAA5

EPA proposed the TTHM and HAA5 MCLs in 1994 and finalized them in 1998 via a negotiated rule-making process (59 *Federal Register* 38668; July 29, 1994; 63 *Federal Register* 69390, December 16, 1998). The MCLs reflect the limit of treatment feasibility given uncertainties about disinfection byproduct formation kinetics and the variability of formation conditions across drinking water systems. Thus, the group MCLs were not derived using the approach shown in 2.2.1.

Exhibit A-1 shows the two group MCLs, 0.08 mg/L for TTHMs and 0.06 mg/L for HAA5. It also lists the contaminants in each group, along with their respective MCLG values. These two groups are unique in that they include carcinogens with MCLG values of zero and noncarcinogens. EPA did not promulgate MCLG values for two of the HAA5 contaminants because health effects information was insufficient.

Exhibit A-1. MCLGs and MCLs for Regulated Disinfection Byproducts

DBP	MCLG (mg/L)	MCL (mg/L)
TTHMs*	(a)	0.080
Chloroform	0	(a)
Bromodichloromethane	0.07	(a)
Dibromochloromethane	0.06	(a)
Bromoform	0	(a)
HAA5**	(a)	0.060
Monochloroacetic acid	0.07	(a)
Dichloroacetic acid	0	(a)
Trichloroacetic acid	0.02	(a)
Monobromoacetic acid	(b)	(a)
Dibromoacetic acid	(b)	(a)

Source: Stage 1 Disinfectants and Disinfection Byproducts Rule; Table II-2. 63 FR 69390, December 16, 1998, and Stage 2 Disinfectants and Disinfection Byproducts Rule, 71 FR 388, January 4, 2006.
(a) = not applicable
(b) = not promulgated
* TTHM refers to the sum of the concentrations of chloroform, bromodichloromethane, dibromochloromethane, and bromoform.
** HAA5 refers to the sum of the concentrations of mono-, di-, and Trichloroacetic acids, and mono- and dibromoacetic acids.

Appendix B: Beta Emitter Sum of the Fractions Compliance

The unit of measurement for beta and photon emitters in drinking water is activity per volume, measured in picocuries per liter (pCi/L). Therefore, the compliance determination equation must convert each beta and photon emitter quantity, denoted C_i and measured in pCi/L, to a fraction of the maximum exposure risk 4 mrem /yr. Therefore, the compliance equation contains a multiplier for each radionuclide i, which is the concentration of radionuclide i that is equivalent to a 4 mrem /yr exposure risk (C_i^m) (EPA, 2000a). Multiplying each radionuclide concentration by the inverse of its maximum exposure quantity converts the concentration to fraction of a 4 mrem /yr dose. Thus, the compliance equation is a "sum of the fractions" function (EPA, 2002):

$$4\,mrem \geq 4 \times \sum_{i=1}^{B} \frac{C_i}{C_i^m}.$$

To illustrate the compliance equation, Exhibit B-1 shows the calculation for an example of four radionuclides.

Exhibit B-1. Illustrative Conversion of Beta Particle and Photon Emitters

Emitter	(X) Lab Analysis (pCi/L)	(Y) Conversion Factor (pCi/4mrem)*	(X/Y=A) Calculated Fraction**	(A*4) Calculated Total mrem
Cessium-134	5,023	20,000	0.25115	NA
Iodine-131	2	3	0.7	NA
Cessium-137	30	200	0.150	NA
Strontium-90	4	8	0.5	NA
Sum	NA	NA	1.60115	7

Source: EPA (2002); the rounding variations shown occur in the original source.
NA = not applicable
* pCi/L equivalent of 4 mrem of exposure.
** Fraction of the maximum 4 mrem / year exposure limit.

The conversion factors for individual beta/photon emitters correspond approximately to a lifetime fatal cancer risk of 1×10^{-4}. EPA (2000a; see Table III-3) provides a table of the factors, which were based on factors in NBS (1963).

NDWAC Climate Report: Progress and Challenges

CLIMATE READY WATER UTILITIES EPA

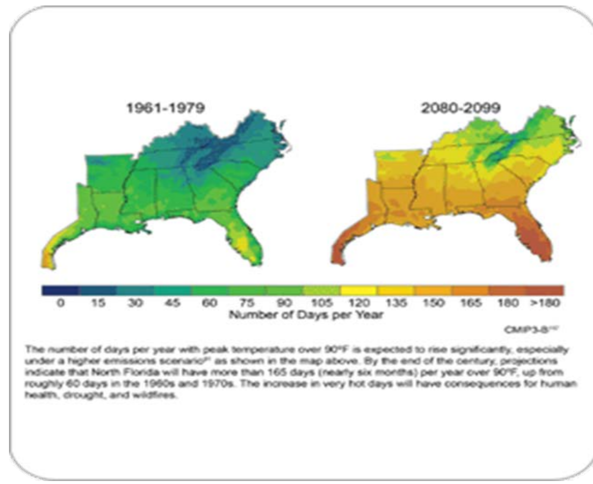
Presenter: David Travers
Water Security Division, Office of Ground Water and Drinking Water, USEPA

NDWAC Climate Working Group

In 2009, NDWAC approved the formation of a working group to evaluate "Climate Ready Water Utilities"

The charge included:

1. Developing <u>attributes</u> of climate ready water utilities
2. Identifying climate change-related <u>tools, training</u> and products to address utilities' short- and long-term needs
3. Identifying mechanisms that would <u>facilitate the adoption</u> of climate change adaptation and mitigation strategies by the water sector



NDWAC Climate Working Group

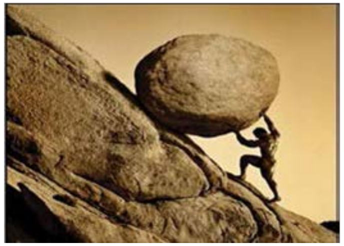
- **Twenty members of CRWU Working Group**
  - 12 from water utilities
  - 3 from state and local governments
  - 5 from academic, environmental, and other organizations
- **Federal partners include**
  - US Army Corps of Engineers, Centers for Disease Control and Prevention, and Federal Emergency Management Agency

Summary of Recommendations

- **11 findings, 12 recommendations** (slides 26-30)

- **Create and implement a Climate Ready program**

- **Improve coordination on climate change among federal agencies and partners**



- **Strengthen and deploy decision support models and tools**

Summary of Recommendations

- Integrate climate information into existing technical assistance initiatives
- Establish training programs for utilities
- Develop adaptive regulatory capacity

Continuum of Engagement

Climate ready utilities respond adaptively based on local conditions, needs, and capacity

- ***Basic Engagement***: General awareness and implementation of "effective utility management" choices
- ***Focused Engagement***: Explicit, climate-related planning; and operational adaptation and mitigation actions and investments

CRWU Mission Statement

To provide the water sector with the practical tools and training to adapt to climate change by promoting a clear understanding of climate science and adaptation options.




Climate Ready Tools & Resources

Adaptation: Uncertainty

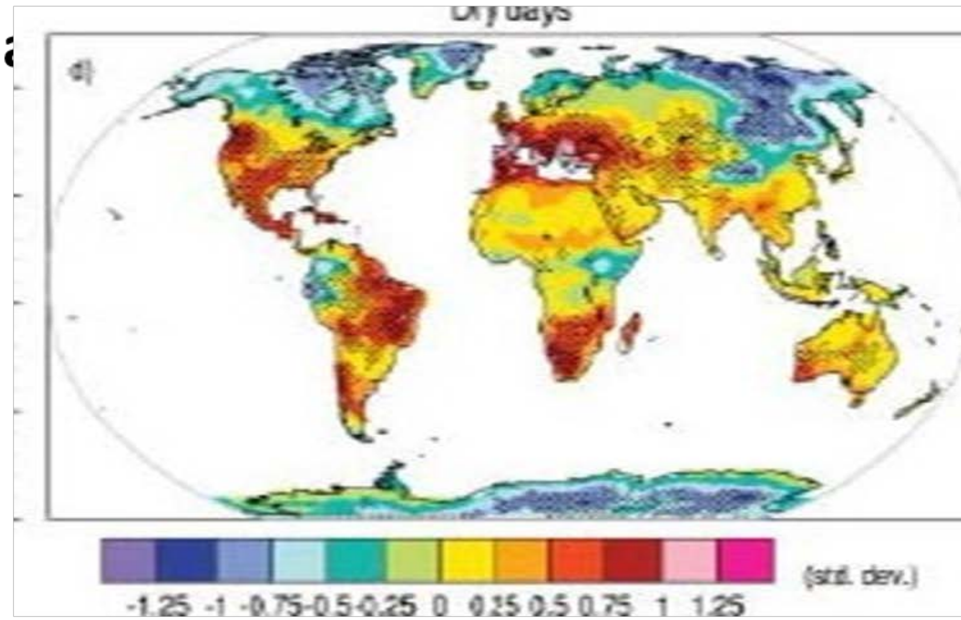
- **First step**

  Provision of Impact Forecasts → Understanding/ Action

- **Downscaling**
  - Universal obsession with
  - Were they designed for decision making?
    - Nassim Taleb: We're suckers for those who provide guidance for the future
  - Critical, but more supplementary

Adaptation: Uncertainty

- Adaptation strategies require more accurate predictions than are possible with current models
- Such predictions are a prerequisite for effective adaptation decision making
- Emphasis on downscaling, refining models resulting in no-regrets or wait-and-see approach

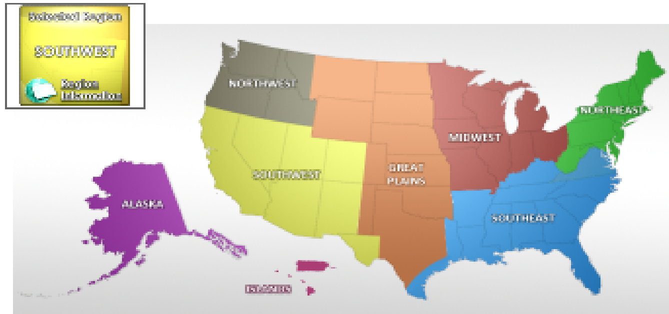


optimization vs robustness

Adaptation: Uncertainty (is the only certainty there is)

- **Uncertainty stems from limited knowledge, randomness, and human actions**
- **Such uncertainty will persist indefinitely**
- **Design a provisional approach to create awareness of potential impacts, adaptation and mitigation options**
  - Reduce and/or manage uncertainty (adaptive management)
  - Range of plausible impact scenarios (scenario-based planning)
  - Vulnerability analysis → Decisions → Data
  - What we should be doing anyway as part of sound stewardship

National Drinking Water Advisory Council



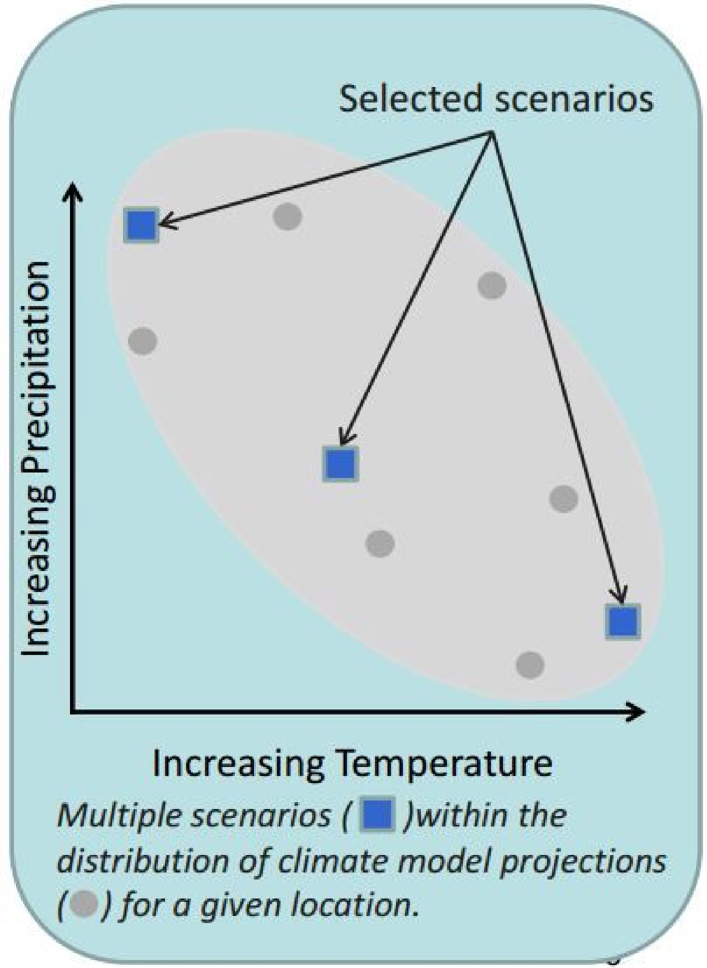
Climate Change Drivers

The list of threats below are those related to at least one selected driver. You can scroll as needed to see the threats that are available for selection.

Challenges / Threats	Increasing Temperature ☑	Changing Precipitation ☑	Changing Storm Intensity & Freq. ☑	Rising Sea Level ☑	Relevant Regional Threat ☑
Altered demand and competing use					
Changes in agricultural practices & outdoor use	X	X	X		
Changes in energy sector water needs	X	X			X
Changes in influent flow & temperature	X	X	X		X
Changes in residential use	X				X
Altered or loss of ecosystem services					
Altered vegetation / wildfire risk	X	X			X
Loss of coastal landforms			X	X	
Loss of wetlands	X	X	X	X	
Degraded water quality					
Altered surface water quality	X	X	X	X	
Saline intrusion into aquifers		X		X	
Increased flood frequency & extent					
Coastal storm surges			X	X	
High flow events		X	X		X
Increased incidence of droughts					
Lower lake and reservoir levels	X	X			X
Reduced groundwater recharge	X	X			

CREAT

- Scenarios, based on a single model projection, selected for each grid cell
  - Hot and Dry model
  - Central model
  - Warm and wet model
- Data provided for two time periods (2020-2050 and 2045-2075)



Changes in Annual Temperature

Period	Hot/Dry	Central	Warm/Wet
2035	2.41°F	2.27°F	1.76°F
2060	4.41°F	4.14°F	3.22°F

Changes in Annual Precipitation

Period	Hot/Dry	Central	Warm/Wet
2035	-9.08%	-1.59%	7.95%
2060	-16.62%	-2.91%	14.55%

Changes in 100-y Storm Intensity

Period	Hot/Dry	Central	Warm/Wet
2035	5.72%	15.83%	6.81%
2060	10.46%	28.89%	12.44%

Rise in Sea Level by 2060

+7.25 to 18.47 inches

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CREAT Pilots (2015 only)

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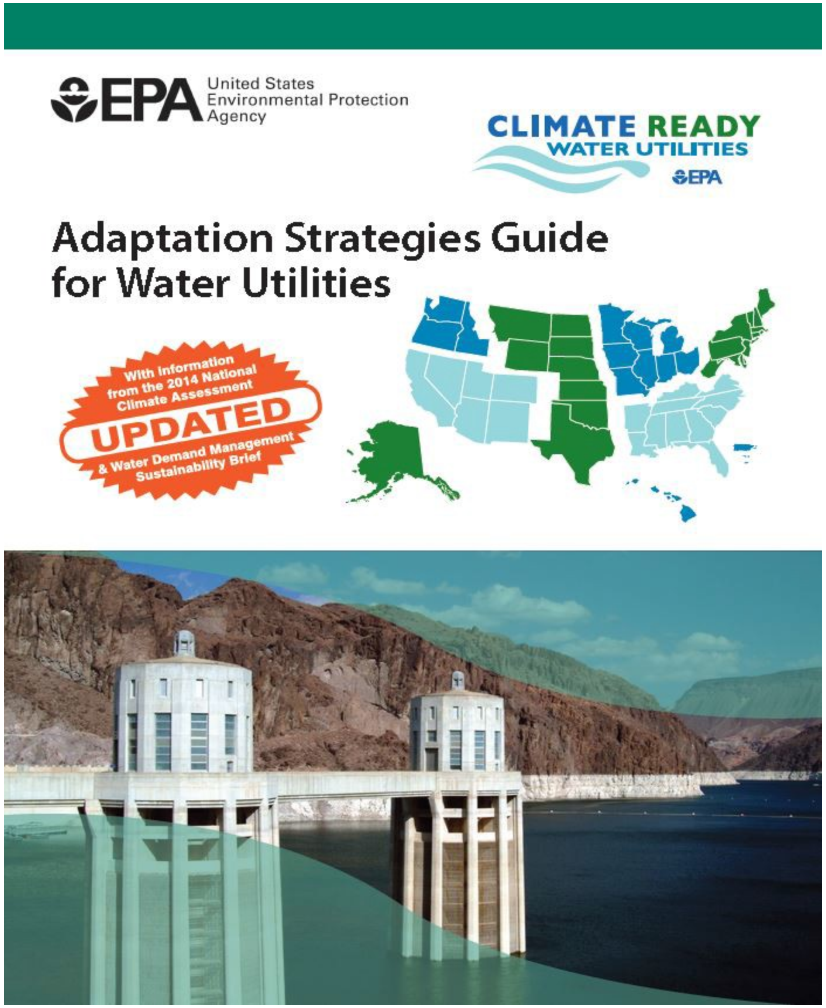

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United States Environmental Protection Agency

CLIMATE READY WATER UTILITIES

EPA

Climate Region Brief > SOUTHWEST

Return to Introduction

Climate change in the southwestern United States is projected to continue to follow already observable trends. Temperature rise, shifts in precipitation patterns and timing, and altered hydrologic cycles can be expected due to climate change. The following statements, drawn from U.S. Global Change Research Program assessments (USGCRP 2009, USGCRP 2014), are based on projections for climate conditions at the end of the 21st century – using both high and low emissions scenarios (IPCC 2000).

OBSERVED AND PROJECTED CHANGES

- The 2001-2010 decade was the warmest on record. Average observed temperatures in the Southwest were almost 2°F higher than historic averages, with the region experiencing more heat waves and fewer cold snaps.
- Projected increases in summertime temperatures are greater than the increase of annual average temperature in parts of the region and will likely be exacerbated locally by expanding urban heat island effects.
- Less winter precipitation falling as snow and earlier spring snow melt are projected to shift runoff and most of the annual streamflow to earlier in the year.
- Future droughts are projected to be substantially hotter. For major river basins, such as the Colorado River Basin, drought is projected to become more frequent, intense and longer lasting than in the historical record (Cayan et al. 2012).
- Increasing temperature will cause more droughts, wildfires and invasive species colonization, which will accelerate transformation of the landscape. Models project a doubling of burned area in the Southern Rockies (Litschert et al. 2012) and up to 74% more fires in California (Westerling et al. 2012). The area burned in the Southwest has increased by more than 300% compared to the 1970s and 1980s. Drought has been widespread in the Southwest since 2000; the drought conditions during the 2000s were the most severe average drought conditions of any decade.
- Increased flood risk in the Southwest is likely to result from a combination of decreased snow cover on the lower slopes of high mountains and an increased fraction of winter precipitation falling as rain, which will run off more rapidly and alter the timing of flooding.

GROUP		DW	WW
Drought	Reduced groundwater recharge	💧	
	Lower lake & reservoir levels	💧	
	Changes in seasonal runoff & loss of snowpack	💧💧	
Water Quality Degradation	Low flow conditions & altered water quality		💧💧
	Saltwater intrusion into aquifers	💧	
	Altered surface water quality	💧	💧
Floods	High flow events & flooding	💧💧	💧💧
	Flooding from coastal storm surges	💧	💧
Ecosystem Changes	Loss of coastal landforms / wetlands	💧	💧
	Increased fire risk & altered vegetation	💧💧	💧💧
Service Demand & Use	Volume & temperature challenges	💧💧	💧💧
	Changes in agricultural water demand	💧💧	
	Changes in energy sector needs	💧💧	
	Changes in energy needs of utilities	💧💧	💧💧

Click on a group name above to read more about these impacts or click on a water drop above to read more about a specific impact.

💧💧 = Particularly relevant to Southwest 💧 = Somewhat relevant

ADAPTATION STRATEGIES GUIDE FOR WATER UTILITIES

Continued on page 2

EPA United States Environmental Protection Agency

CLIMATE READY WATER UTILITIES EPA

Group: DROUGHT (DW)

Return to Introduction

Observed data indicate that drought intensity and frequency have been increasing in the United States during the last few decades, especially in much of the West. Average values of the Palmer Drought Severity Index from 2000-2010 indicated the most severe average drought of any decade on record. Summer droughts are expected to intensify in most regions of the United States (USGCRP 2014). The impacts to water utilities from drought associated with climate change may be driven or forced by changing water levels in aquifers and reservoirs, loss of snowpack and reductions in surface water flows. Clicking on the drinking water icon next to each impact name will bring you to that particular Strategy Brief. Clicking on the Green Infrastructure or Water Demand Management icon will bring you to that Sustainability Brief.

Reduced Groundwater Recharge DW

Reduced precipitation and higher loss of water from plants and evaporation due to higher temperatures will decrease surface water supplies and groundwater recharge, especially impacting utilities that rely on groundwater supplies. Review this brief to learn more about how the Inland Empire Utilities Agency (IEUA) used stormwater capture and water recycling to counteract the effects of reduced groundwater recharge and how Tucson Water has constructed a large-scale recharge and recovery system to secure its water supply through 2050.

Lower Lake and Reservoir Levels DW

Decreases in mean annual precipitation and higher loss of water from vegetation and evaporation due to higher temperatures will lead to lower levels in the lakes and reservoirs that water utilities rely on for surface water supplies. These lower levels may make it difficult to meet water demands, especially in the summer months, and may drop water levels below intake infrastructure. Review this brief to learn more about how Southern Nevada Water Authority (SNWA) uses aggressive conservation practices and new construction to address falling water levels in Lake Mead.

Changes in Runoff and Loss of Snowpack DW

Increased temperatures and shifting precipitation patterns will alter seasonal runoff and storage of water in snowpack. These changes in water supply could strain the capacity of reservoirs to hold larger and earlier peak runoff flows, cause shortages in the summer due to longer duration of the warmer and drier season and compromise biodiversity goals (e.g., managing cold-water fish, such as salmon and trout). Lower annual precipitation will lead to lower streamflow in many locations, which may lead to diminished water quality. Diminished water quality in receiving waters may lead to more stringent requirements for wastewater discharges, leading to higher treatment costs and the need for capital improvements. Review this brief to learn more about how the Portland Water Bureau is considering expanding its groundwater supply or surface water storage to offset the impacts seasonal runoff changes will have on water supply and how East Bay Municipal Utility District (EBMUD) used results of a "bottom up" sensitivity analysis to plan for impacts related to projected earlier runoff.

ADAPTATION OPTIONS

Click to left of name to check off options for consideration; $'s ($-$$$) indicate relative costs
Click name of any option to review more information in the Glossary
No Regrets options - actions that would provide benefits to the utility under current climate conditions as well as any future changes in climate. For more information on No Regrets options, see Page 11 in the Introduction.
Click on the , or icon to review the relevant Sustainability Brief.

✓	PLANNING	COST
	Develop models to understand potential water quality changes (e.g., increased turbidity) and costs of resultant changes in treatment.	$
	Incorporate monitoring of groundwater conditions and climate change projections into groundwater models.	$

ADAPTATION STRATEGIES GUIDE FOR WATER UTILITIES

Continued on page 2

National Drinking Water Advisory Council

National Drinking Water Advisory Council

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Environmental Protection
Agency

FLOOD RESILIENCE

A Basic Guide for Water and Wastewater Utilities

Select a menu option below.
First time users should start with the Overview.

National Drinking Water Advisory Council

FLOOD RESILIENCE: A Basic Guide for Water and Wastewater Utilities

Return to Step 1 Worksheet

Interpreting FEMA Flood Maps

FLOOD MAP

Flood Map is the common term used to refer to a Flood Insurance Rate Map (FIRM) developed by FEMA. Local and state governments use these maps to understand the threat of flooding and to devise hazard mitigation plans (including possible projects) to mitigate the effects of flooding in their communities. Flood Maps can be obtained through FEMA's Map Service Center. To identify your relevant Flood Map, enter the address of your facility or vulnerable asset(s). An example map including legend, index and title box is provided in Figure 2.

FIGURE 2: EXAMPLE FLOOD MAP – JEFFERSON CITY, MISSOURI

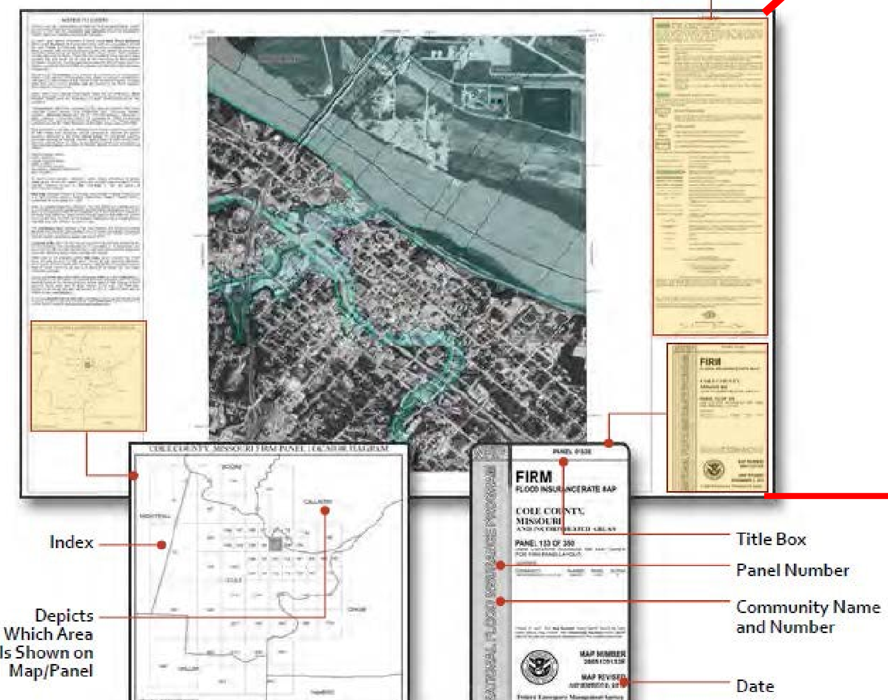
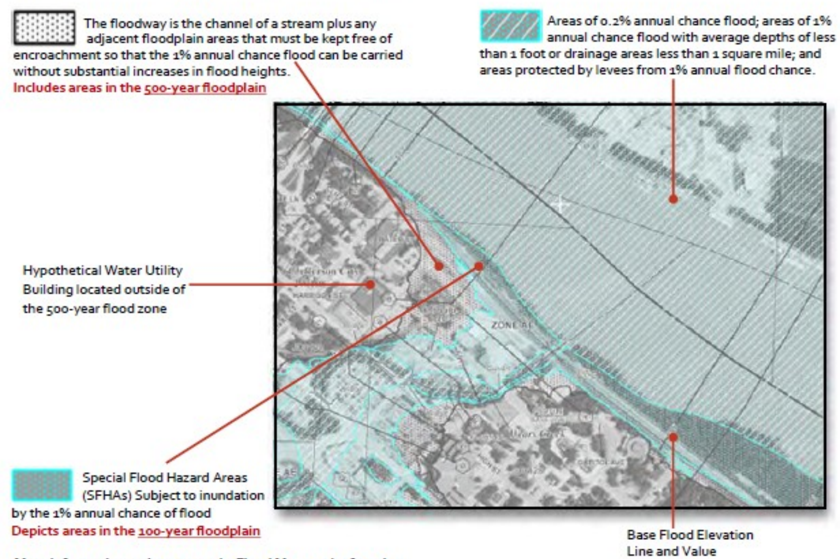


FIGURE 3: CLOSE-UP OF EXAMPLE FLOOD MAP



More information on how to read a Flood Map can be found at http://www.floodsmart.gov/floodsmart/pages/flooding_flood_risks/understanding_flood_maps.jsp

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National Drinking Water Advisory Council

FLOOD RESILIENCE: A Basic Guide for Water and Wastewater Utilities

Return to Mitigation Options

Mitigation Options

BOOSTER STATIONS AND OTHER PUMPS

✓ Drinking water

Flood waters can severely damage pumps, thereby impacting the entire drinking water system from intake through distribution. Similarly, loss of facility power could render pumps inoperable without adequate backup power. Vulnerable water facility control systems include pump controls, variable frequency drives, electrical panels, motor control centers and Supervisory Control and Data Acquisition (SCADA) systems.

See the following checklist for potential flood mitigation optior

✓	Mitigation Options for Booster Stations and Other Pumps	Cost
	1. Prevent booster stations from flooding.	
	a) Procure temporary flood barriers (e.g., sandbags) for use in minor floods.	$
	b) Install permanent physical barriers (e.g., flood walls, levees, sealed doors).	$$
	2. Protect critical components if booster stations do flood.	
	a) During upgrades or design of new equipment, develop capability to temporarily remove and safely store vulnerable components in advance of a flood.	$-$$$
	b) Waterproof, relocate or elevate motor controls, variable frequency drives, computers and electrical panels to a higher elevation by constructing platforms or integrating controls into existing buildings or infrastructure on-site.	$$
	c) De-energize systems prior to flooding to mitigate damage to electrical components.	$
	d) Replace non-submersible pumps with submersible pumps, if cost effective.	$$-$$$
	e) Replace standard electrical conduits with sealed, waterproof conduits. Replace	$$$

Ongoing Work and Goals

- CRWU continues to improve program tools
- Provide training and assistance for pilot utilities using CREAT
- Update CREAT
- Drought Resiliency Guide
- Updates to Adaptation Strategies Guide to include information on sustainability, energy and cost

Challenges

- Interpreting and translating climate data into actionable data
- More compelling incentives (bonds)
- Reaching small systems
- Competing priorities relative to climate change
- How to bring impacts on decadal horizons into current day thinking
- Political dimension
- Credibility

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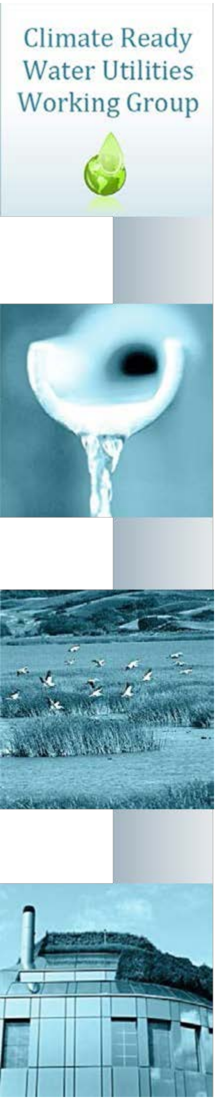
Key Theme of the Findings: Climate "Readiness"

- Readiness should reflect adaptive learning and management
- Expanded concept of infrastructure is a key element
- Inclusion of sector interdependencies in decisions is critical
- Capacity to engage in climate ready activities varies
- Robust enabling environment needed for success
- Research should be guided by specific needs of water sector

Climate Ready
Water Utilities
Working Group

Findings

1. The water sector faces important and potentially substantial climate change adaptation challenges, but also opportunities.
2. Proactive, climate ready actions will enhance water sector utility resilience.
3. Different local conditions will dictate different climate ready responses.
4. Utility "climate readiness" is an emerging concept that must therefore reflect an adaptive learning and management framework.
5. An expanded concept of "water system infrastructure" is a key element of utility climate readiness.
6. To succeed, individual utilities need a robust enabling environment.



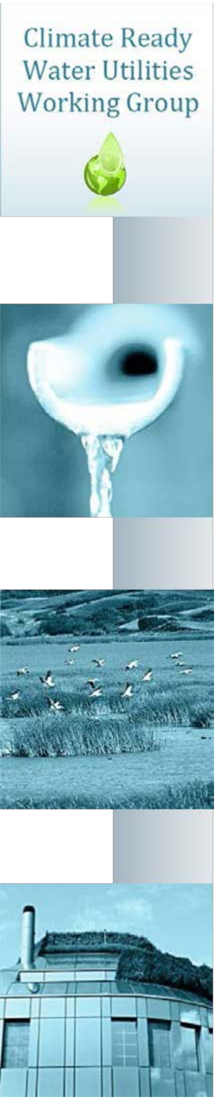
Findings (cont.)

7. Many utilities do not have the capacity to become climate ready.
8. Climate change impacts create challenges for current "regulatory stationarity."
9. Water sector utilities are overwhelmed with climate change information and lack of coordination by federal agencies, state agencies, and other water sector actors.
10. The water sector is underserved by climate science and by information regarding adaptation and mitigation costs and benefits.
11. Water sector utility greenhouse gas (GHG) mitigation efforts are an important aspect of the sector's climate-related strategy.

Climate Ready Water Utilities Working Group

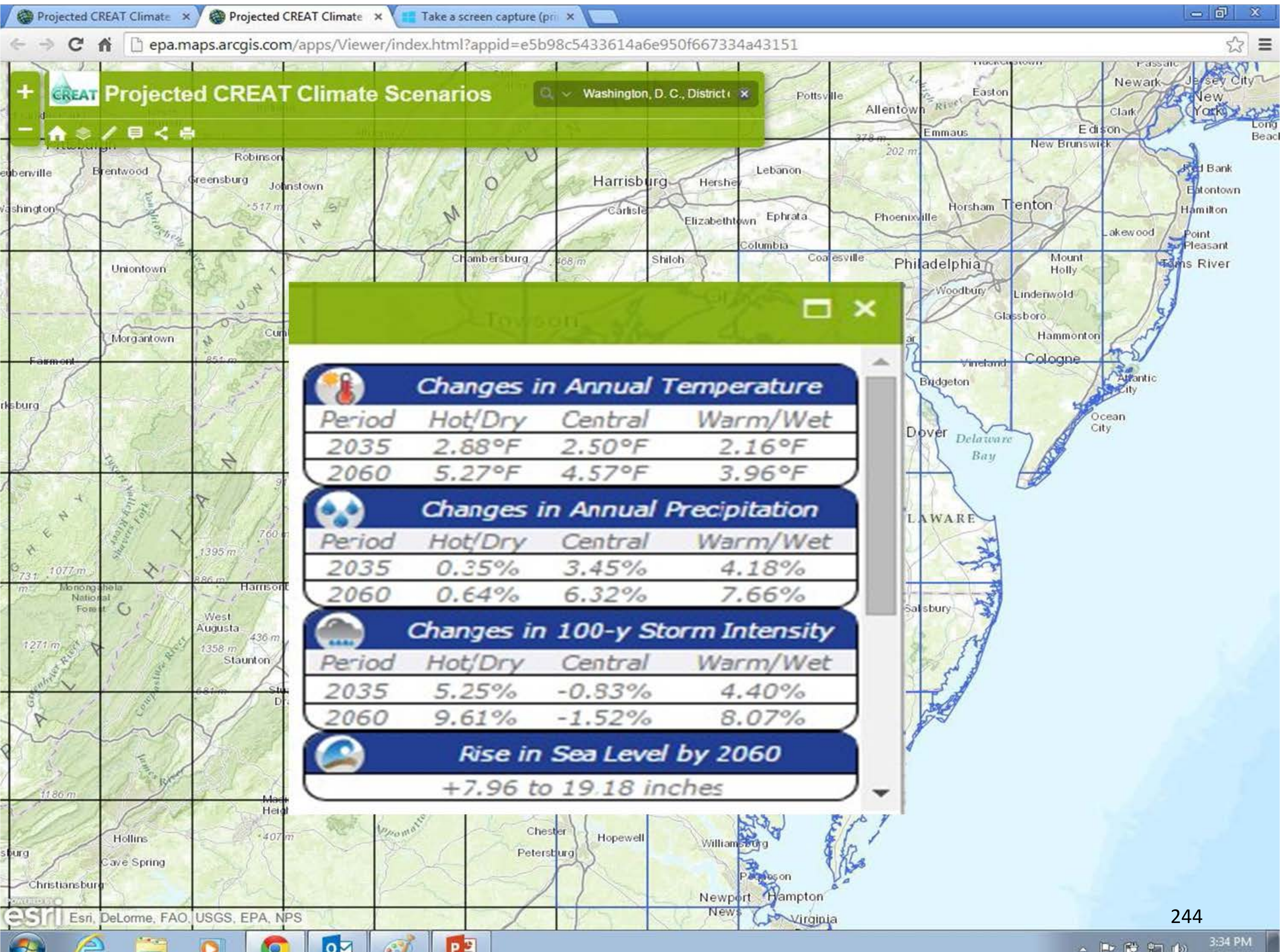
Recommendations

1. EPA should develop a program to support the adoption of climate ready activities.
2. EPA should build out the concept of “climate ready” utilities based on the Findings and CRWU Adaptive Response Framework.
3. Establish for utility staff a climate change continuing education and training program.
4. Build on and strengthen advanced decision support models and tools to support utility climate change efforts.
5. Increase interdependent sector knowledge of water sector climate-related challenges and needs.
6. Improvements in, and better integration of, watershed planning and management in response to climate uncertainty and impacts.



Recommendations (cont.)

7. Improve access to and dissemination of easy-to-understand and locally relevant climate information.
8. Better integrate climate change information into existing utility technical assistance initiatives.
9. Develop an adaptive regulatory capacity in response to potential climate change alteration of underlying ecological conditions and systems.
10. Develop a comprehensive water sector, climate change research strategy.
11. Advocate for better coordination of federal agency climate change programs and services.
12. EPA should take the following early action steps in close cooperation with applicable federal agencies, NGOs, and water sector professional associations.



Changes in Annual Temperature

Period	Hot/Dry	Central	Warm/Wet
2035	2.88°F	2.50°F	2.16°F
2060	5.27°F	4.57°F	3.96°F

Changes in Annual Precipitation

Period	Hot/Dry	Central	Warm/Wet
2035	0.35%	3.45%	4.18%
2060	0.64%	6.32%	7.66%

Changes in 100-y Storm Intensity

Period	Hot/Dry	Central	Warm/Wet
2035	5.25%	-0.83%	4.40%
2060	9.61%	-1.52%	8.07%

Rise in Sea Level by 2060

+7.96 to 19.18 inches

Introduction to Water Reuse

Background and Overview of the Office of Water Activities

Presenter: Michelle Schutz
Office of Ground Water and Drinking Water, EPA

Water Supply Challenges

- In response to current water challenges including drought, cities and states are looking to augment their water supplies
- A Potential Framework to Maximize Water Availability
  - Conservation
  - Water Efficiency
  - Consolidation
  - Alternate Water Supplies
  - Water Reuse
    - Indirect Potable Reuse
    - Direct Potable Reuse

Indirect versus Direct Potable and Potable versus Non-Potable Reuse

- Indirect Potable Reuse (IPR) occurs when a utility discharges reclaimed water into surface water or groundwater supplies for the specific purpose of augmenting the drinking water supply
- Direct Potable Reuse (DPR), for purposes of this discussion, means the use of water from a regulated water reclamation plant or recycling facility (which may or may not include an engineered buffer such as tanks)
- Potable Water is water that has been treated, cleaned filtered or disinfected and meets established drinking water standards
- Non-Potable Water is water that is not of drinking water quality, but which may still be used for many other purposes depending on the quality and need

Reuse as an Option

- The ability to reuse water has positive benefits that are also the key motivators for implementing reuse programs
- Water Reuse Drivers
  - Water Availability
  - Climate Change
  - Population Growth
  - Climate Independent Water Source

Reuse Guidelines

- In the U.S., water reclamation and reuse standards are the responsibility of state and local agencies. Currently there are no federal regulations.
- 1980 EPA developed the first *Guidelines for Water Reuse* as a technical research report for ORD
- 2012 the Guidelines were updated and mainly address Indirect Potable Reuse

States Implementing Reuse

- As of 2012, a number of states have adopted regulations, guidelines or design standards to cover direct or indirect potable water reuse (Examples include: CA, AZ, NM, TX, CO, FL, GA, VA, WY, WA)

Office of Water Reuse Activities

- Cooperative Research and Development Agreement (CRADA) with Camp Dresser McKee (CDM) Smith – Developing a compendium to the 2012 Guidelines on on the state of play for potable water reuse
  - Status: Scheduled to be complete in Early 2015
- Member of Project Advisory Committee for WateReuse White Paper
  - Provide oversight on a white paper being developed to inform a DPR Framework
  - Goal of Framework will be to a provide a source of information and expert judgement on potable reuse

Office of Water Reuse Activities

- Evaluating ambient water quality criteria for viruses
- Currently collecting data on viruses in raw sewage with coordination of the FDA (FDA considers viruses to be an effective indicator for wastewater treatment). This will inform any additional activities regarding IPR and DPR.

Next Steps

- Work with states to determine the need for an EPA guidance on Direct Potable Reuse
- Provide an update to NDWAC at the Spring 2015 meeting

Drinking Water Health Advisories for Cyanotoxins

Presenter: Lesley V. D'Anglada, Dr.PH
US Environmental Protection Agency Office of Water/Office of Science and Technology

Presentation Overview

- Describe public health guidelines for cyanotoxins in place
- Discuss the toxicity assessment done for the three cyanotoxins listed in CCL
- Opportunity for Questions

Overview of Harmful Algal Blooms

- The prevalence and duration of Harmful algal blooms (HABs) in freshwater is rapidly expanding in the U.S. and worldwide.
- Some algal blooms can produce toxins at levels that may be of concern for human health and ecological impact.
- HABs have caused economic losses to the fishing and recreation industries while increasing costs for managing and treating potable water supplies.




Guidelines and Regulations for Drinking Water

- No federal regulations or guidelines for cyanobacteria or cyanotoxins in drinking water in the U.S.
- Candidate Contaminant List (CCL):
- Guidance values for drinking water have been adopted by 3 states

State	Drinking Water Guidance/Action Level
Minnesota	Microcystin-LR: 0.04 µg/L
Ohio	Microcystin : 1 µg/L Tox Eq ; Anatoxin-a: 20 µg/L; Cylindrospermopsin: 1 µg/L; Saxitoxin: 0.2 µg/L
Oregon	Microcystin: 1 µg/L Tox Eq; Anatoxin-a: 3 µg/L ; Cylindrospermopsin: 1 µg/L; Saxitoxin: 3 µg/L

Guidelines for Cyanotoxins

- WHO 1998 (provisional)
  - microcystins (based on LR) value for drinking water of 1µg/L and 20µg/L for recreational contact
- Canada 2002 (final)
  - total microcystins value for drinking water of 1.5µg/L
- EPA NCEA 2006 (draft for drinking water)
  - microcystin-LR short term/subchronic: 1.4 µg/L; chronic 0.1 µg/L
  - Cylindrospermopsin subchronic: 1 µg/L
  - Anatoxin a: short term: 70 µg/L; subchronic 14 µg/L
- Australia 2011 (suggested for drinking water)
  - microcystin-LR: 1.3 µg/L
  - Cylindrospermopsin: 1 µg/L
  - Anatoxin a: 3 µg/L

DW Health Advisories (HA) for Cyanotoxins

Microcystin-LR, Anatoxin-a, and Cylindrospermopsin

- Joint collaboration with Health Canada

- HA are non-regulatory concentrations at which adverse health effects are not anticipated to occur over specific exposure durations: one-day, ten-day, and Lifetime.

- Includes:
  - General information and properties
  - Occurrence and exposure
  - Toxicokinetics
  - Health effects data
  - Quantification of toxicological effects
  - Other criteria, guidance, and standards
  - Analytical methods
  - Treatment technologies

Cyanotoxins Toxicity Assessment

- Health Effects Support Document
  - Comprehensive Review of health effects information form exposure to cyanotoxins
    - Includes a Quantification of Dose
      - ResponseRfD for microcystin-LR
      - RfD for cylindrospermopsin
      - External and Internal Peer Review
      - EPA currently addressing the comments

$$\text{RfD} = \frac{\text{NOAEL(LOAEL)}}{\text{UF}}$$

Preliminary Human Health Assessment on Microcystin

Toxicity Assessment Summary:

- The toxicological database is almost exclusively limited to data on the MC-LR congener.
- Acute and sub-chronic toxicity studies confirm the liver, kidney and testes as target organs.
- Chronic toxicity studies have not observed clinical signs of toxicity.
- Reproductive and developmental toxicity studies showed decreased in sperm counts and a reduction in sperm motility after 3 and 6 months with severity increasing with longer duration of exposure.
- Research gaps identified:
  - None of the available studies are considered adequate for carcinogenicity assessment of microcystins.
  - Very limited information is available on the toxicity via inhalation exposure.
  - Limited information on the relative potencies of other microcystin congeners when compared to MC-LR

Preliminary Human Health Assessment on Cylindrospermopsin

Toxicity Assessment Summary:

- Based on acute and sub-chronic studies done in mice, liver and kidneys appear to be the primary target organs for cylindrospermopsin toxicity.
- There are no chronic exposure studies on cylindrospermopsin.
- There are few studies on the genotoxicity of cylindrospermopsin, and there is some evidence of potential damage to DNA in mouse liver or causes mutations.
- Research gaps identified:
  - The chronic toxicity of cylindrospermopsin is unknown.
  - None of the available studies are considered adequate for carcinogenicity assessment of cylindrospermopsin.
  - No information on acute or chronic inhalation toxicity of cylindrospermopsin was identified.

Preliminary Human Health Assessment on Anatoxin-a

Toxicity Assessment Summary:

- The main known toxic effect of anatoxin-a is acute neurotoxicity.
- There are no cancer, genotoxicity, acute or chronic exposure studies on anatoxin-a, thus there is inadequate information to assess carcinogenic potential.
- Not enough information on sensitive endpoints and associated dose-response relationships to develop an RfD.
- Research gaps identified:
  - No acute oral studies using purified anatoxins could be found.
  - No chronic oral studies have been performed.
  - There is no information on carcinogenicity in humans or animals or on possible carcinogenic processes.
  - No information regarding mutagenicity or genotoxicity of anatoxin-a was identified.

Next Steps DW Health Advisories

- Development of DW Health Advisories for Microcystin and Cylindrospermopsin
  - Quantification of Toxicological Effects (HA values)
  - Analytical Methods
  - Treatment Techniques
- Internal Review
- External Review
- Publication – Spring 2015

Contact Information

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CyanoHABs website

United States
Environmental Protection Agency

Office of Water
Mail Code 4304T

EPA 810F11001
September 2014

Cyanobacteria and Cyanotoxins: Information for Drinking Water Systems

Summary

This fact sheet provides public water systems (PWSs) basic information on human health effects, analytical screening tools, and the effectiveness of various treatment processes to remove or inactivate the three most commonly occurring cyanotoxins in water bodies that are a source of drinking water throughout most of the U.S. and are listed on EPA's third drinking water Candidate Contaminant List: microcystin-LR, anatoxin-a, and cylindrospermopsin. Other cyanotoxins such as saxitoxins and anatoxin-a(S) also occur in U.S. water bodies that are a source of drinking water, but they are generally thought to be less common. Therefore, this fact sheet does not address these other well-known toxins produced by cyanobacteria such as the paralytic shellfish toxins (Saxitoxin family), anatoxin-a(S), the lyngbyatoxins, or taste and odor contaminants caused by the cyanobacteria.

Background

The Safe Drinking Water Act (SDWA) protects public health by regulating the nation's public drinking water supply and its sources: rivers, lakes, reservoirs, springs, and ground water wells. The SDWA requires EPA to publish a list of unregulated contaminants that are known or expected to occur in public water systems in the U.S. that may pose a risk in drinking water. This list is known as the Contaminant Candidate List (CCL). For more information on the CCL program visit http://water.epa.gov/scitech/drinkingwater/dws/ccl/

The cyanotoxins included in the most recent CCL are produced by several species of cyanobacteria (cyanobacteria are known as blue-green algae). The most widespread of the cyanotoxins are the peptide toxins in the class called microcystins. There are at least 80 known microcystins, including Microcystin-LR, which is generally considered one of the most toxic. More than a dozen countries have developed regulations or guidelines for microcystins in drinking water and recreational waters. Most of the drinking water guidelines are based on the World Health Organization provisional value for drinking waters of 1.0 µg/L microcystin-LR. No federal regulatory guidelines for cyanobacteria or their toxins in drinking water or recreational waters exist at this time in the U.S. At the moment of this publication, EPA is in the process of developing drinking water health advisories for microcystin-LR and cylindrospermopsin. There are currently a few states that have established cyanotoxin monitoring guidelines and cyanotoxin threshold levels for PWSs. PWSs are responsible for following those guidelines/thresholds and for undertaking any follow-up action required by their state.

Causes of cyanobacterial harmful algal blooms

Cyanobacteria are photosynthetic bacteria that share some properties with algae and are found naturally in lakes, streams, ponds, and other surface waters. Similar to other types of algae, when conditions are favorable, cyanobacteria can rapidly multiply in surface water and cause "blooms." Several types of cyanobacteria, for example *Anabaena flos-aquae,* have gas-filled cavities that allow them to float to the surface or to different levels below the surface, depending on light conditions and nutrient levels. This can cause the cyanobacteria to concentrate on the water surface, causing a pea-soup green color or blue-green "scum." Some cyanobacteria like *Planktothrix* agardhii, can be found in bottom sediments and float to the surface when mobilized by storm events or other sediment disturbances. Other cyanobacteria blooms may remain dispersed through the water column (*Cylindrospermopsis* sp.) leading to a generalized discoloration of the water.

Conditions that enhance growth of cyanobacterial harmful algal blooms

Factors that affect cyanobacterial bloom formation and persistence include light intensity and total sunlight duration, nutrient availability (especially phosphorus), water temperature, pH, an increase in precipitation events, water flow (whether water is calm or fast-flowing), and water column stability. Although bloom conditions in much of the US are more favorable during the late summer, the interrelationship of these factors causes large seasonal and year-to-year fluctuations in the cyanobacteria levels. Some toxin-producing strains can occur early in the summer season while others are only found during late summer.

Effects of cyanobacterial harmful algal blooms

Cyanobacterial blooms can be harmful to the environment, animals, and human health. The bloom decay consumes oxygen, creating hypoxic conditions which result in plant and animal die-off. Under favorable conditions of light and nutrients, some species of cyanobacteria produce toxic secondary metabolites, known as cyanotoxins. Common toxin-producing cyanobacteria are listed in Table 1. The conditions that cause cyanobacteria to produce cyanotoxins are not well understood. Some species with the ability to produce toxins may not produce them under all conditions. These species are often members of the common bloom-forming genera. Both non-toxic and toxic varieties of most of the common toxin-producing cyanobacteria exist, and it is impossible to tell if a species is toxic or not toxic by looking at it. Also, even when toxin-producing cyanobacteria are present, they may not actually produce toxins. Furthermore, some species of cyanobacteria can produce multiple types and variants of cyanotoxins. Molecular tests are available to determine if the cyanobacteria, *Microcystis* for example, carry the toxin gene; quantitative cyanotoxin analysis is needed to determine if the cyanobacteria are actually producing the toxin. Water contaminated with cyanobacteria can occur without associated taste and odor problems.

In most cases, the cyanobacterial toxins naturally exist intracellularly (in the cytoplasm) and are retained within the cell. Anatoxin-a and the microcystin variants are found intracellularly approximately 95% of the time during the growth stage of the bloom. For those species, when the cell dies or the cell membrane ruptures the toxins are released into the water (extracellular toxins). However, in other species, cylindrospermopsin for example, a significant amount of the toxin may be naturally released to the water by the live cyanobacterial cell; the reported ratio is about 50% intracellular and 50% extracellular. Extracellular toxins may adsorb to clays and organic material in the water column and are generally more difficult to remove than the intracellular toxins.

Health effects caused by cyanotoxins

Exposure to cyanobacteria and their toxins could be by ingestion of drinking water contaminated with cyanotoxins and through direct contact, inhalation and/or ingestion during recreational activities. The acute recreational exposure to cyanobacterial blooms and their cyanotoxins can result in a wide range of symptoms in humans (Table 1) including fever, headaches, muscle and joint pain, blisters, stomach cramps, diarrhea, vomiting, mouth ulcers, and allergic reactions. Such effects can occur within minutes to days after exposure. In severe cases, seizures, liver failure, respiratory arrest, and (rarely) death may occur. The cyanotoxins include neurotoxins (affect the nervous system), hepatotoxins (affect the liver), and dermatoxins (affect the skin). However, there have been new studies of effects in other systems, including hematological, kidney, cardiac, reproductive, and gastrointestinal effects. There is evidence that long-term exposure to low levels of microcystins and cylindrospermopsin may promote cell proliferation and the growth of tumors. However, more information is needed to determine the carcinogenicity of both microcystins and cylindrospermopsin.

Table 1. Cyanotoxins on the Contaminant Candidate List (CCL)

<table>
<tr><th>Cyanotoxin</th><th>Number of Known Variants or Analogues</th><th>Primary Organ Affected</th><th>Health Effects[1]</th><th>Most Common Cyanobacteria Producing Toxin[2]</th></tr>
<tr><td>Microcystin-LR</td><td>80~90</td><td>Liver</td><td rowspan="2">Abdominal pain
Vomiting and diarrhea
Liver inflammation and hemorrhage
Acute pneumonia
Acute dermatitis
Kidney damage
Potential tumor growth promotion</td><td>Microcystis
Anabaena
Planktothrix
Anabaenopsis
Aphanizomenon</td></tr>
<tr><td>Cylindrospermopsin</td><td>3</td><td>Liver</td><td>Cylindrospermopsis
Aphanizomenon
Anabaena
Lyngbya
Rhaphidiopsis
Umezakia</td></tr>
<tr><td>Anatoxin-a group[3]</td><td>2-6</td><td>Nervous System</td><td>Tingling, burning, numbness, drowsiness, incoherent speech, salivation, respiratory paralysis leading to death</td><td>Anabaena
Planktothrix
Aphanizomenon
Cylindrospermopsis
Oscillatoria</td></tr>
</table>

[1]Source: *Harmful Algal Research and Response National Environmental Science Strategy (HARRNESS)*
[2]Not all species of the listed genera produce toxin; in addition, listed genera are not equally as important in producing cyanotoxins.
[3]The anatoxin-a group does not include the organophosphate toxin anatoxin-a(S) as it is a separate group. In the US, the most common member is thought to be anatoxin-a, and thus this toxin is listed specifically.

There have been many documented reports of dog, bird and livestock deaths throughout the world as the result of consumption of surface water with cyanobacterial blooms. In 1996, one hundred and sixteen patients at a renal dialysis clinic in Caruaru, Brazil were affected and experienced headache, eye pain, blurred vision, nausea and vomiting when they were exposed intravenously to water containing a mixture of microcystin and cylindrospermopsin (Carmichael et al., 2001). Subsequently, 100 of the affected patients developed acute liver failure and, of these, 76 died. Analyses of blood, sera, and liver samples from the patients revealed only the microcystin toxin.

Analytical methods

Table 2 describes the methods available for cyanotoxin measurement in freshwater. Commercially available Enzyme-Linked Immunosorbent Assay (ELISA) test kits are one of the more commonly utilized cyanotoxin testing methods, since they do not require expensive equipment or extensive training to run. Semi-quantitative field screening ELISA kits are available for the presence or absence of cyanotoxins. If cyanotoxins are detected by a field screening kit, repeat analysis is recommended using either a quantitative ELISA test or one of the other analytical methods identified in Table 2.

More precise, more quantitative ELISA test kits are available for microcystin-LR, microcystins/nodularins (ADDA), saxitoxin, and cylindrospermopsin. In addition, a rapid receptor-binding assay kit is available for the detection of anatoxin-a. Although they provide rapid results, ELISA kits generally have limitations in specificity and are not congener specific. In addition, some cross-reactivity may occur. The microcystins/nodularins (ADDA) kit is based on the ADDA structure within the microcystin molecule and is designed to detect over 80 microcystin congeners identified to date (but cannot distinguish between congeners).

Methods that utilize liquid chromatography combined with mass spectrometry (LC/MS) can precisely and accurately identify specific microcystin congeners for which standards are available; LC/MS methods have also been designed to minimize matrix interference. At this time there are only standards for a limited number of the known microcystin congeners. If congener-specific information is needed, an LC/MS method should be considered. HPLC-PDA methods are less specific than LC/MS methods and the quantitation is more problematic due to a less specificity and to sample matrix interference. However, when analytical toxin standards are available for confirmation, they could provide a measure of resolution of the congeners present.

Sample handling considerations

Samples must be handled properly to ensure reliable results. Detailed procedures are typically specified in the particular analytical methods/SOPs. Water systems should obtain and follow sample collection and handling procedures established by the laboratory performing the analysis. Laboratories establishing such procedures may wish to consult the USGS sampling protocol Guidelines for design and sampling for cyanobacterial toxin and taste-and-odor studies in lakes and reservoirs (2008)

Among the most important sample handling considerations are the following:

- Collection – Bottle type, volume, and preservative used depend on the laboratory doing the analysis. Generally, samples should be collected and stored in amber glass containers to avoid potential cyanotoxin adsorption associated with plastic containers and to minimize exposure to sunlight.

Table 2. Methods Available for Cyanotoxin Detection*

Freshwater Cyanotoxins			
Methods	**Anatoxins**	**Cylindrospermopsins**	**Microcystins**
Biological Assays			
Mouse	Yes	Yes	Yes
Protein Phosphatase Inhibition Assays (PPIA)	No	No	Yes
Neurochemical	Yes	No	No
Enzyme-Linked Immunosorbent Assays (ELISA)	No	Yes	Yes
Chromatographic Methods ***Gas Chromatography***			
Gas Chromatography with Flame Ionization Detection (GC/FID)	Yes	No	No
Gas Chromatography with Mass Spectrometry (GC/MS)	Yes	No	No
Liquid Chromatography			
Liquid Chromatography / Ultraviolet-Visible Detection (LC/UV or LC/PDA)	Yes	Yes	Yes
Liquid Chromatography/Fluorescence (LC/FL)	Yes	No	No
Liquid Chromatography Combined with Mass Spectrometry			
Liquid Chromatography Ion Trap Mass Spectrometry (LC/IT MS)	Yes	Yes	Yes
Liquid Chromatography Time-of-Flight Mass Spectrometry (LC/TOF MS)	Yes	Yes	Yes
Liquid Chromatography Single Quadrupole Mass Spectrometry (LC/MS)	Yes	Yes	Yes
Liquid Chromatography Triple Quadrupole Mass Spectrometry (LC/MS/MS)	Yes	Yes	Yes

*Adapted from Analytical Methods for Cyanotoxin Detection and Impacts on Data Interpretation, presentation by Keith Loftin, Jennifer Graham, Barry Rosen (U.S. Geological Survey) and Ann St. Amand (Phycotech) at the 2010 National Water Quality Monitoring Conference, Workshop. Guidelines for Design, Sampling, Analysis and Interpretation for Cyanobacterial Toxin Studies at Denver, CO on April 26, 2010.

- Quenching – samples (particularly “finished” drinking water samples) that have been exposed to any treatment chemicals should be quenched immediately upon sampling. Sodium thiosulfate or ascorbic acid are commonly used as quenching agents.
- Chilling – samples should be cooled immediately after collection; during shipping; and pending analysis at the laboratory. Depending on the analytical method being used, sample freezing (taking precautions to avoid breakage) may be appropriate to extend holding times.

Sample analysis considerations

When measuring "total" cyanotoxins (both intracellular and dissolved (extracellular) toxins), rupturing cyanobacterial cells (lysing) is generally employed to break the cell wall and release the toxins into solution. Freeze/thaw cycling (traditionally carried out over three or more cycles) represents the most common lysing technique, though some analytical methods rely on other approaches. Lysing is particularly important for samples collected prior to the PWS filter effluent. For a well-designed, well-operated PWS lysing would not be expected to have a significant impact on finished water (post-filtration) samples as cyanobacteria cells should not be present at significant levels in the finished water. Some analysts elect to confirm the effectiveness of raw-water lysing (or to judge the need for finished-water lysing) using microscopic examination for intact algal cells.

Cyanotoxin treatment and bloom management

Once cyanobacteria and/or their cyanotoxins are detected in the surface water supplying the water system, the treatment system operators can act to remove or inactivate them in a number of ways. Some treatment options are effective for some cyanotoxins, but not for others. Effective management strategies depend on understanding the growth patterns and species of cyanobacteria that dominates the bloom, the properties of the cyanotoxins (i.e., intracellular or extracellular), and appropriate treatment processes. For example, oxidation of microcystin depends on the chlorine done, pH and the temperature of the water. Applying the wrong treatment process at a specific state in treatment could damage cells and result in the release rather than removal of cyanotoxins.

Table 3 summarizes the effectiveness of different types of water treatment to remove intact cyanobacteria cells and treatment processes that are effective in removing extracellular dissolved toxins of several of the most important cyanobacteria. Drinking water operators are encouraged to monitor the treated water to guarantee the removal of cyanotoxins. For more information and resources on treatment processes for cyanotoxins please visit http://www2.epa.gov/nutrient-policy-data/control-and-treatment

To avoid the release of cyanotoxins into the water, drinking water operators can undertake different management strategies to deal with cyanobacteria blooms. For example, those drinking water utilities that have access to more than one intake can switch to an alternate one that is not as severely impacted by the bloom. Another management alternative is to adjust intake depth to avoid drawing contaminated water and cells into the treatment plant.

Pretreatment oxidation at the intake poses several concerns with respect to lysing cells and releasing toxins. Copper sulfate and ozone at the intake are not recommended because of the risk of lysing algal cells. Chlorination, in addition to lysing the cells, has the potential to produce disinfection by-products during water treatment. If pretreatment oxidation is needed, it is important to carefully evaluate the influent as successful pre-oxidation depends on the algal species, oxidant and dose. Potassium permanganate ($KMnO_4$) at low levels could be used to remove *Microcystis* cells. Inline powdered activated carbon (PAC) could also be used to remove any toxins that may have been released.

Table 3. Cyanotoxin Treatment Processes and Relative Effectiveness

Treatment Process	Relative Effectiveness
Intracellular Cyanotoxins Removal (Intact Cells)	
Pre-treatment oxidation	Oxidation often lyses cyanobacteria cells releasing the cyanotoxin to the water column. If oxidation is required to meet other treatment objectives, consider using lower doses of an oxidant less likely to lyse cells (potassium permanganate). If oxidation at higher doses must be used, sufficiently high doses should be used to not only lyse cells but also destroy total toxins present (see extracellular cyanotoxin removal).
Coagulation/ Sedimentation/ Filtration	Effective for the removal of intracellular toxins when cells accumulated in sludge are isolated from the plant and the sludge is not returned to the supply after sludge separation.
Membranes	Study data are limited; it is assumed that membranes would be effective for removal of intracellular cyanotoxins. Microfiltration and ultrafiltration are effective when cells are not allowed to accumulate on membranes for long periods of time.
Flotation	Flotation processes, such as Dissolved Air Flotation (DAF), are effective for removal of intracellular cyanotoxins since many of the toxin-forming cyanobacteria are buoyant.
Extracellular Cyanotoxins Removal (Dissolved)	
Membranes	Depends on the material, membrane pore size distribution, and water quality. Nanofiltration is generally effective in removing extracellular microcystin. Reverse osmosis filtration is generally applicable for removal of extracellular microcystin and cylindrospermopsin. Cell lysis is highly likely. Further research is needed to characterize performance.
Potassium Permanganate	Effective for oxidizing microcystins and anatoxins. Further research is needed for cylindrospermopsin.
Ozone	Very effective for oxidizing extracellular microcystin, anatoxin-a, and cylindrospermopsin.
Chloramines	Not effective.
Chlorine dioxide	Not effective with doses used in drinking water treatment.
Chlorination	Effective for oxidizing extracellular cyanotoxins as long as the pH is below 8; ineffective for anatoxin-a.
UV Radiation	Effective at degrading microcystin and cylindrospermopsin but at impractically high doses.
Activated Carbon	Powdered activated carbon (PAC): Effectiveness varies highly based on type of carbon and pore size. Wood-based activated carbons are generally the most effective at microcystin adsorption. Carbon is not as effective at adsorbing saxitoxin or taste and odor compounds. Doses in excess of 20mg/L may be needed for complete toxin removal. Granular activated carbon (GAC): Effective for microcystin but less effective for anatoxin-a and cylindrospermopsins.

The standard drinking water treatment processes (coagulation, flocculation, sedimentation and filtration) can be effective in removing intracellular cyanotoxins. Coagulation, flocculation and dissolved air flotation (DAF) are more effective than sedimentation. Microfiltration and ultrafiltration are highly effective at removing intact cyanobacterial cells. During an active bloom, operators may need to alter process parameters to account for the increased loading of cyanobacteria. It may be necessary to backwash filters more frequently to prevent retained cells from releasing intracellular toxins.

Common treatment techniques for the removal of extracellular toxins include activated carbon, membrane filtration and chemical inactivation (Ultraviolet (UV), disinfectants and oxidants). Both powdered activated carbon (PAC) and granular activated carbon (GAC) have been effective in adsorbing microcystin and cylindrospermopsin, although microcystin variants may have different adsorption efficiencies. The performance of activated carbon depends on the concentration of the toxin and the dose and origin of the activated carbon. Jar tests are recommended to test the effectiveness of various PAC types, with the implementation of the carbon with the greatest capacity for removal of the target contaminants. GAC filters are effective in removing microcystins if they are properly replaced or regenerated. Nanofiltration and reverse osmosis may be effective in removing cylindrospermopsin and microcystin. However, site specific tests are recommended as removal efficiency depends on the membrane pore size distribution and water quality.

It is impractical to deliver ultraviolet (UV) radiation at the doses required to photolytically destroy microcystin, anatoxin-a, and cylindrospermopsin in a process setting. UV has been used along with a catalyst (titanium dioxide) to oxidatively decompose the toxins; however, the effectiveness of this process is largely dependent on the organic content of the water. Oxidants like chlorine, ozone and $KMnO_4$ can be used to inactivate microcystins but chlorine effectiveness is pH-dependent. Various cyanotoxins react differently to chlorine; for example, anatoxin-a is resistant to inactivation by chlorine. However, if the pH is below 8, chlorine is effective for inactivation of microcystin and cylindrospermopsin. Ozone can be a good oxidant for microcystins, but its efficacy may be affected by the presence of organic matter. Ozone can also be used as an oxidant for anatoxin-a and cylindrospermopsin; however, ozone is pH-dependent for the oxidation of anatoxin-a (pH 7 to 10) and for cylindrospermopsin (4 and 10). KMnO4 is effective in oxidizing microcystin and anatoxin-a (from pH 6 to 8), but is not very effective for cylindrospermopsin. Chloramines and chlorine dioxide are not effective treatments for microcystin, anatoxin-a or cylindrospermopsin.

Formation of disinfection by-products is another potential problem with the use of ozone, copper sulfate, and chlorine when there are high bromide concentrations in the water. However, results from studies on the impact of chlorination of cell-bound toxins and resulting disinfection by-products formation are contradictory. The majority of the findings suggest that pre-chlorination should ideally be avoided during blooms, unless adequate CT values[1] can be guaranteed to ensure efficient oxidation of broken cyanobacteria.

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[1] A CT value is used in the calculation of disinfectant dosage for chlorination of drinking water. A CT value is the product of the concentration of a drinking water disinfectant and the contact time with the water being disinfected (typically expressed in units of mg-min/L).

Developing a contingency plan

Water supply managers should develop a contingency plan for cyanobacterial bloom occurrence. Most algal blooms are not toxic, and the plan should address how to determine the potential risk associated with each event. Elements of such a plan should include a Monitoring Program to determine when and where to sample; sampling frequency; sample volume; whether to sample for cyanobacterial cells or specific cyanotoxins or both; which analytical screening test to use; and conditions when it is necessary to send sample(s) to an identified laboratory for confirmation. Water supply managers should also develop a Management and Communication plan including what treatment option(s) to use to reduce the potential of cyanotoxins in the finish water or reaching the distribution system; and identifying the required communication steps to coordinate with the agencies involved the appropriate actions that must be taken, and the steps to inform consumers and the public. Chapter 6 (Situation Assessment, Planning and Management) from the WHO's *Toxic Cyanobacteria in Water: A guide to their public health consequences, monitoring and management* and the Incident Management Plans chapter from the *International guidance manual for the management of toxic cyanobacteria* (Water Quality Research Australia) could be used as resources to develop such plans.

For more information

Visit EPA's Cyanobacteria Harmful Algal Blooms (CyanoHABs) web page at http://www2.epa.gov/nutrient-policy-data/cyanobacterial-harmful-algal-blooms-cyanohabs.

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Reducing Nutrient: Pollution under the Clean Water Act: EPA's Approach

Presenter: Tom Wall, Director, Assessment and
Watershed Protection Division
U.S. EPA Office of Water

Outline

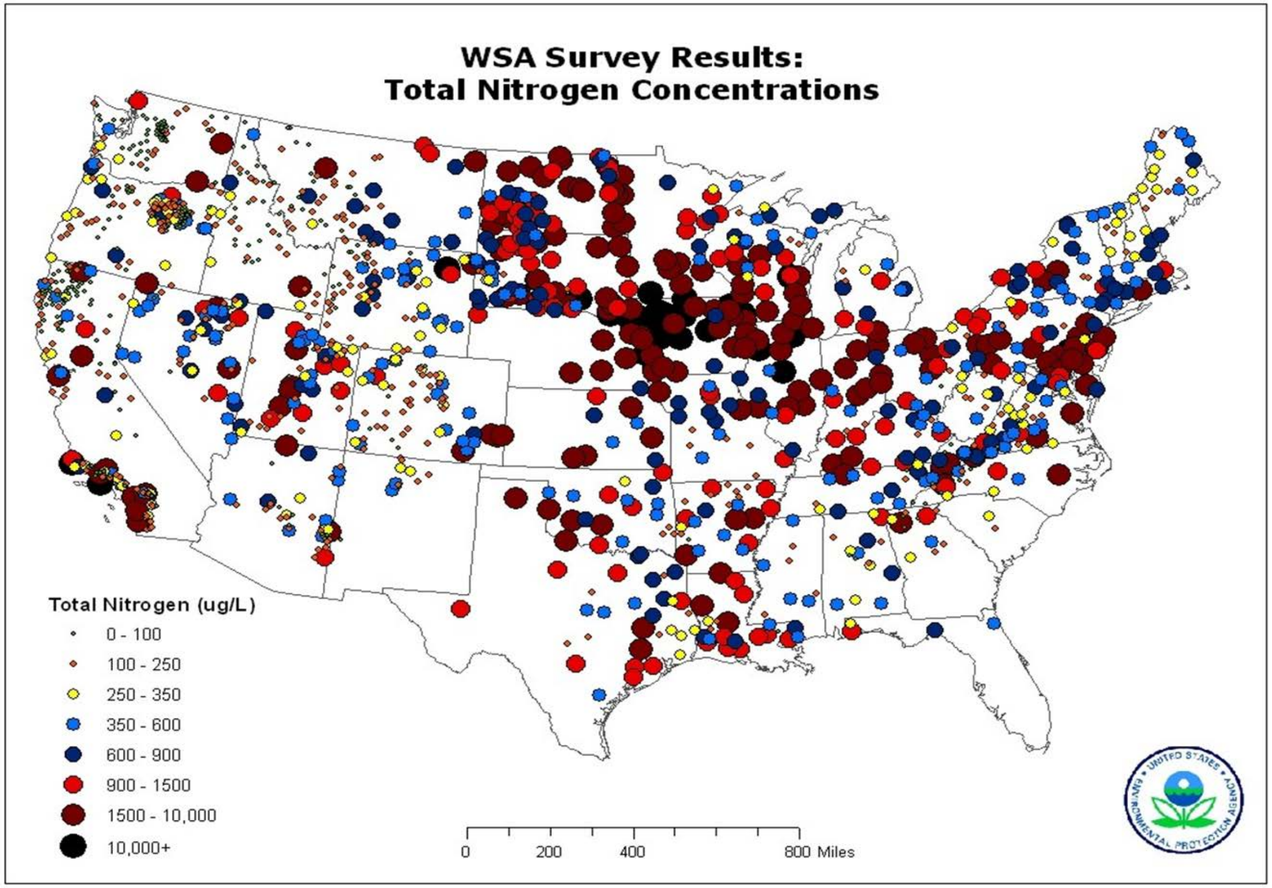
- National Scope of Nutrient Pollution
- Public Health and Aquatic Impacts
- Our Goals and How We Will Get There
- Nitrogen & Phosphorus Sources
- Call to Action: Helping State Progress via Nutrient Frameworks
- Looking Ahead

The Problem……

National Scope of Nutrient Problem

- **Well Documented Problem and Impacts, e.g.:**
  - EPA: Science Advisory Board (2007), Wadeable Streams and Lakes Assessments (2006, 2008), National Coastal Condition Report III (2008)
  - National Research Council: Mississippi River Water Quality (2008), Urban SW (2008)
  - USGS: Impact of Nutrients on Groundwater (2010), SPARROW Loadings (multiple)
  - Many published articles, State and university reports
  - State EPA Nutrient Innovations Task Group (NITG) *Call to Action* Report
- **15,000 Nutrient-related Impairment Listings in 49 States…an underestimate**
  - 2.5 Million Acres of Lakes and Reservoirs & 80,000 Miles of Rivers and Streams
  - >47% of Streams have Med to High P; >53% have Med to High N
- **78% of Assessed Continental U.S. Coastal Area Exhibits Eutrophication Symptoms**
- **168 Hypoxic Zones in U.S. Waters**
- **Public Health Risks – Contaminated Drinking Water is Significant & Costly**
  - Rate of nitrate violations in community water systems doubled over past 7 years

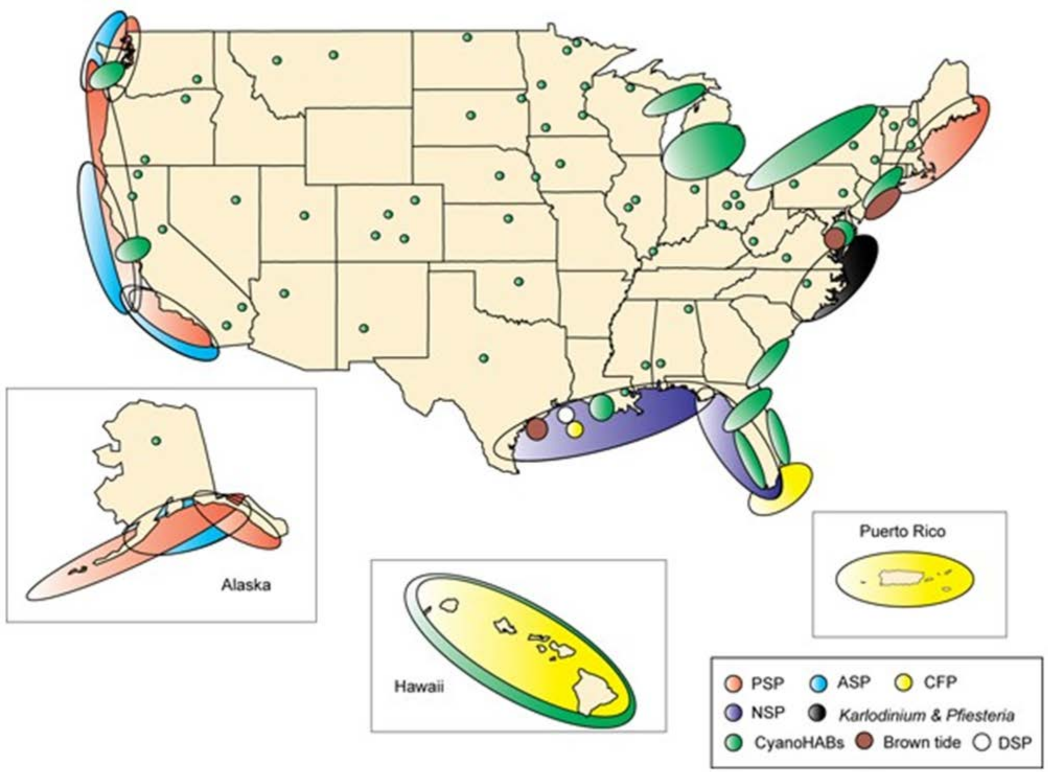
Concentrations of Nitrogen Nationally



2010 USGS Report Nutrients in Streams & Groundwater

- Analysis of occurrence data from 1992 to 2004
- Nitrate MCLG exceeded in 7% of 2,400 DW wells sampled
- Nitrogen concentrations generally highest in Ag streams in Northeast, Midwest, & Northwest
- Despite substantial Federal, State and local efforts, limited national progress during this period
- Nitrate concentrations likely to increase in drinking water aquifers over next decade as nitrogen moves downward into the groundwater system.

Algal Bloom Occurrences in the United States (WHOI 2007).



National Drinking Water Impacts

Public Health Risks:

Disinfectant by-products; significant & costly

–Contaminated drinking water supplies

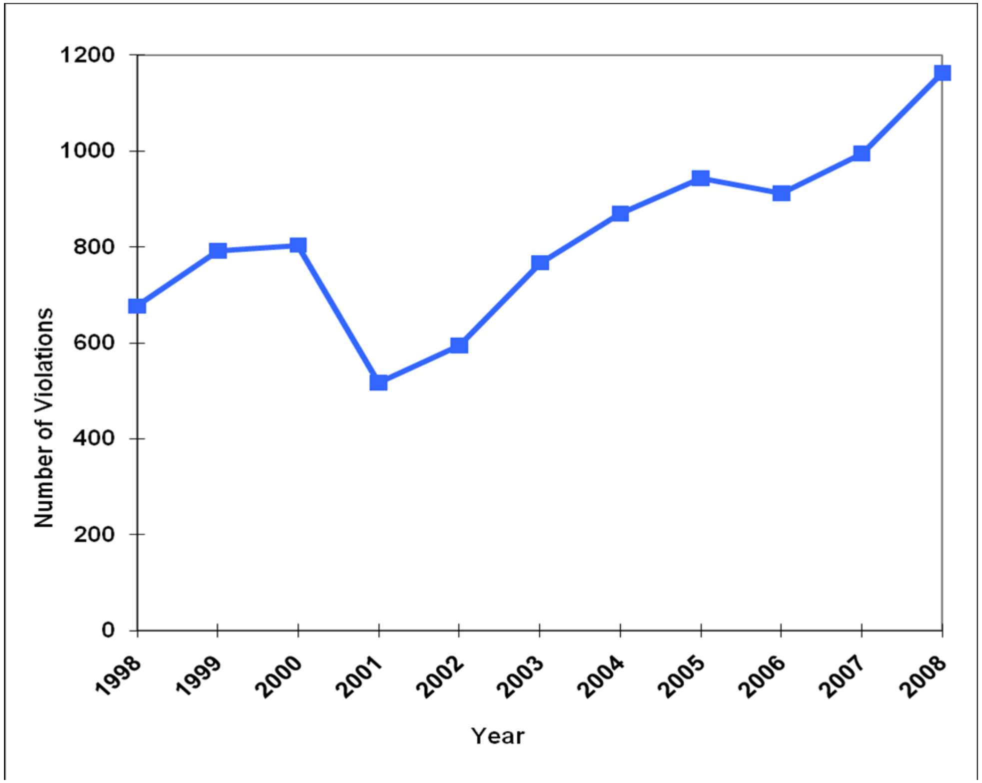
–Rate of nitrate violations in community water systems has doubled over past 7 years

–Harmful algal blooms

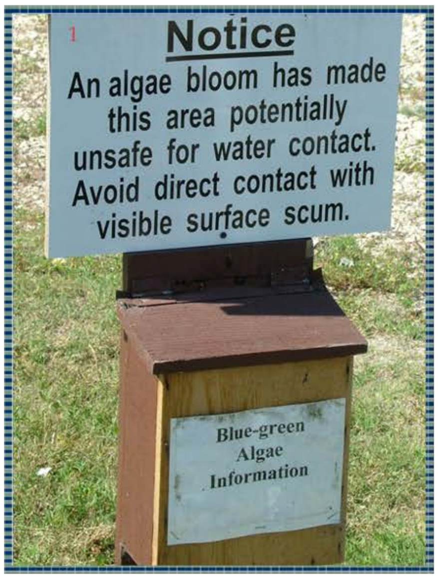
–Increased treatment costs

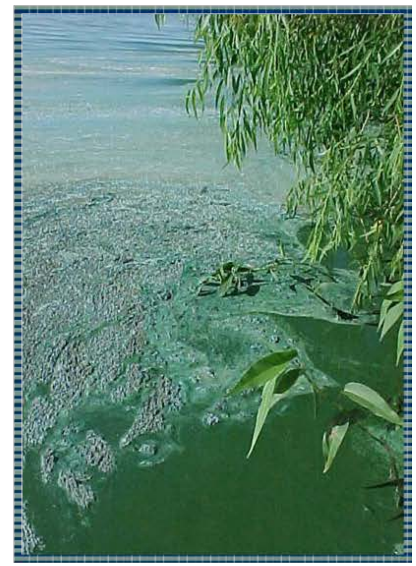
- Large Systems
- Small Systems
- Private Wells

Community Water System (CWS) Drinking Water Nitrate Violations



Impaired Reservoirs – examples






Microcystis bloom - August 2003
Toledo Water Intake

Grand Lake St. Mary's Ohio 2010

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Impaired Streams – examples

Impacts on Downstream Waters

Microcystis Bloom – Goodby's Creek at the St. Johns River, Jacksonville, FL – September 14, 2005

Health Advisory listed by the FL Department of Health as a result of algal blooms and fish kill in the St. Johns River, Jacksonville, FL - June 15, 2010

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National Population Growth

- Nutrient Impacts Reflect Doubling of U.S. Population Over Past 50 Years
- Additional 135 Million People by 2050
- Nutrient Pollution Expected to Accelerate

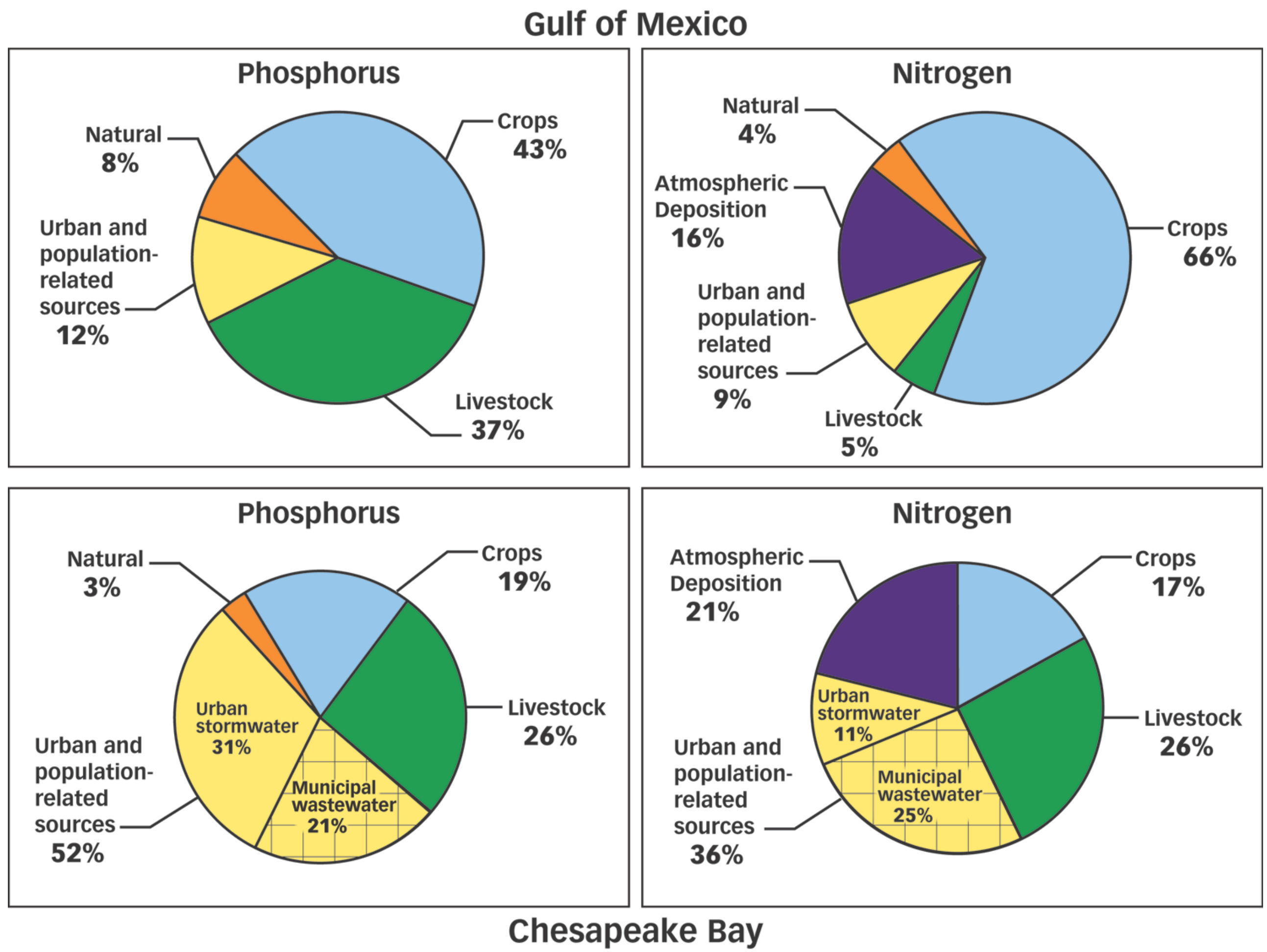
Year	U.S. Population
1950	152 million
2008	304 million
2050	439 million

Our Goals

- **Reduce** sources of nitrogen and phosphorus pollution
- **Restore** surface and ground waters already degraded by nutrient pollution
- **Build** federal/state/local capacity to plan for and reduce such pollution through voluntary as well as regulatory means
- **Communicate** about the effects of nutrient pollution

What are the N & P Sources?

- **Municipal Wastewater Treatment**
  - Among most heavily regulated sectors in US, treat >18 mil tons of human waste annually
  - >16,500 municipal treatment system permits, ~7% have numeric limits for N or P, 18% monitor for these pollutants
- **Atmospheric Nitrogen Deposition**
  - Regulations in place, more underway
  - These sources can be significant, e.g., in the Chesapeake Bay and Mississippi River watersheds, Atmospheric N accounts for 21% of the source contributions
- **Urban Stormwater**
  - 80% of U.S. pop lives on 10% of land, urban pop impacting coastal areas
  - 50% of existing urban landscape will be redeveloped by 2030, and additional 30% of currently undeveloped land likely to be developed
- **Agricultural Livestock**
  - $130 Billion Industry , >1 bil tons of manure annually
  - Substantial Production is Largely Unregulated by CAFO Rule
- **Agricultural Row Crops**
  - $120 Billion Industry, in many areas a significant source of N&P
  - Ag SW Runoff and Irrigation Return Flows Exempt from CWA, Variable Controls at State Level


Gulf of Mexico
Phosphorus
Natural 8%
Crops 43%
Urban and population-related sources 12%
Livestock 37%
Nitrogen
Natural 4%
Atmospheric Deposition 16%
Crops 66%
Urban and population-related sources 9%
Livestock 5%
Phosphorus
Natural 3%
Crops 19%
Urban stormwater 31%
Livestock 26%
Municipal wastewater 21%
Urban and population-related sources 52%
Nitrogen
Atmospheric Deposition 21%
Crops 17%
Urban stormwater 11%
Livestock 26%
Municipal wastewater 25%
Urban and population-related sources 36%
Chesapeake Bay

How Will We Get There?

- Set the stage – work with states nutrient frameworks (more below)
- Pollution prevention, protecting source water and healthy waters, plus restoring waters
- Innovation – promote cost effective and practical solutions
- Assess how we're doing
- Reach the public

Clean Water Act Framework

Set Standards

Technology-Based Approach

- Effluent limitation guidelines for industry and secondary treatment for wastewater plants

Water Quality-Based Approach

- EPA develops water quality criteria information
- States and tribes develop water quality standards and criteria

Implement Programs

- Point Source Permits – regulatory (NPDES)
- Nonpoint Source Program -- voluntary
- Restoring Polluted Waters - TMDLs
- Funding & Technical Assistance
- Wetlands Protection
- Watershed Approaches

What are the Tools?

- **TMDLs (Clean-up Plans)– Essential, but really enough?**
  - Wait Until There's a Problem?
  - Restoration over Prevention - Expensive
  - No Protection for High Quality or Attained Waters
  - We're Losing Ground
- **Permit Limits**
  - Hard to Manage Without Clear Numeric Targets
- **Priority Best Management Practices in Priority Watersheds**
- **Nutrient Criteria**
  - Narrative - Qualitative Goals (traditional approach)
  - Numeric - Quantitative & Measureable Goals
    - Causal and/or response variables?

Why a Nitrogen and Phosphorus Pollution Framework Now?

- Current Efforts to Address Hard Fought but Collectively Inadequate at State and National Level
- Serious problem that is getting worse; potential to become one of the costliest and most challenging environmental problems
- Growing population = more N and P pollution from urban stormwater, municipal and industrial wastewater discharges, air dep., agriculture
- To protect public health and the environment, need to act *now* to reduce N and P loadings -- while states continue to develop numeric nutrient criteria and standards
- Since 1998, EPA has encouraged states to develop numeric nutrient criteria to gauge N and P pollution and develop and implement appropriate solutions

Framework: Guiding Principles

- **Results, results, results**: build from existing state work but accelerate progress and demonstrate clear results
- Encourage a collaborative approach between federal partners, states, and stakeholders
- States need flexibility to achieve near-term reductions in N and P pollution while they make progress on their long term strategies to adopt NNC

Framework Elements: Assessment and Prioritization

- Prioritize watersheds on a statewide basis for nutrient loading reductions
  - Estimate N & P loadings delivered to waters in all major watersheds across the state at HUC8 scale or smaller
  - ID watersheds that account for substantial portion of urban and/or ag
  - ID targeted/priority HUC12 or similar watersheds for targeted N & P load reduction activities, considering receiving water problems, public and private drinking water supply impacts, nutrient loadings, opportunity to address high risk nutrient problems, or other related factors
- Set watershed load reduction goals based upon best available information
  - Set numeric goals for loading reductions for each targeted/priority HUC12 that will collectively reduce the majority of N & P loads from ID'd HUC8

Framework Elements: ID and Implement Metrics, Measures, and Practices to Reduce Loads

- Ensure Effectiveness of Point Source Permits in Targeted/ Priority Sub-watersheds
  - Municipal and Industrial Wastewater Treatment Facilities
  - Concentrated Animal Feeding Operations (CAFOs) that discharge
  - Urban Stormwater
- Agricultural Areas
  - Partner w/ Federal & State Agricultural partners, NGOs, landowners
  - Consider innovative approaches (e.g., stewardship initiatives, markets)
  - Accelerate adoption of the most effective conservation practices where they are most needed
- Reduce Stormwater Runoff and Septic System Impacts
  - Use state, county and local government tools in communities not covered by the MS4 program to address runoff (including LID/GI approaches) and septic systems, consider limits on P use

Framework Elements: Accountability and Transparency

- Accountability and Verification Measures
  - Identify which tools will be used within targeted/priority sub-watersheds to assure reductions will occur
  - Verify that load reduction practices are in place
  - Assess/demonstrate progress in implementing and maintaining management activities and achieving load reductions goals

- Annual public reporting of implementation activities and biannual reporting of load reductions and environmental impacts associated with each management activity in targeted watersheds
  - Establish process to annually report for each watershed
  - Share annual report publically on the state's website with request for comments and feedback for an adaptive management approach

Framework Elements: Numeric Criteria

- Develop work plan and phased schedule for developing numeric criteria for classes of waters (lakes/reservoirs, rivers/streams, and estuaries)
  - Should contain interim milestones, e.g., data collection, data analysis, criteria proposal, and criteria adoption consistent with the CWA
  - Reasonable timetable: complete numeric N & P criteria for at least one class of waters in accordance with a robust, state-specific workplan and phased schedule

- Fundamental goal of the approach is for states to develop numeric WQS on a longer but reasonable schedule while making progress on reducing loads in the near term

Potential Federal Resources

- US EPA –through the State Water Quality Agencies
  - Water Quality Management Planning – Section 604(b)
  - Water Pollution Control Program Grants – Section 106
  - Nonpoint Source Implementation Grants – Section 319
  - State Revolving Fund Program
- USDA Farm Bill Conservation Programs
- – EQIP, CRP, RCPP, CIG, …
- USGS (Cooperative Monitoring Program – state contracts with USGS for water quality monitoring)
- Department of the Army (USACE: 1135, 204, 206)

EPA Technical Assistance: N and P Pollution Data Access Tools

- NPDAT - Consists of a geospatial viewer, introductory website, and data download tables, available at: www.epa.gov/nutrientpollution/npdat
  - Provides streamlined access to these data in one place, in commonly-used formats
- Nutrient Indicators Data Set - http://www2.epa.gov/nutrient-policy-data/nutrient-indicators-dataset
- Supports states as they consider
  - Extent and magnitude of N and P pollution
  - Water quality problems and vulnerabilities related to this pollution
  - Potential pollution sources

Looking Ahead – Key Priorities

- Drinking Water & Ecological Risks and Economic Impacts Documentation
- Broader EPA–USDA Coordination
- Continued Commitment to Science
- Nutrient Management Frameworks
- State Numeric Nutrient Standards
- Broader and More Effective Outreach to Stakeholders
- Stormwater

For More Information:

http://www2.epa.gov/nutrientpollution

A Public Statement from The Humane Society of the United States (The HSUS)

To the National Drinking Water Advisory Council Meeting

(Submitted by Jacqueline Tiaga/jtiaga@humanesociety.org on October 17, 2014)

On behalf of The Humane Society of the United States, the largest animal protection organization in the nation, we would like to thank the Environmental Protection Agency and National Drinking Water Advisory Council for holding this meeting to discuss drinking water protection. As a Harmful Algal Bloom Task Force Partner, The HSUS is particularly interested in and supportive of the Council's work on harmful algal blooms, otherwise known as HABs.

As many of you know, there are over 15,000 bodies of water across the country with issues related to nutrient pollution, affecting all 50 states. [1] While this is a serious concern with regards to safe drinking water, we ask you to also consider how pets, particularly dogs, are adversely affected. In 2013, a Toxins report on select veterinary hospital records discovered 368 cases of cyanotoxic poisoning found in dogs between the late 1920's and 2012. [2] This figure only represents a small subset of outbreaks, but it indicates a real threat to pets. Numerous studies and reports have found that because of their more active behavior, dogs are more susceptible to coming into contact with harmful algae by ingesting toxins while swimming or grooming, drinking infected water, or coming into contact with toxic algae mats. The exact number of affected pets is difficult to assess since the total number of cyanobacterial poisonings is underreported. However, we know the rate of pet mortality as a result of HABs has significantly increased over recent years, probably in conjunction with increased runoff from agricultural or urban sources. Unfortunately, since no federal or state agencies require the regular testing of bodies of water for toxins such as cyanobacteria, pets are usually the first to discover harmful algae blooms.

This problem is likely to worsen in coming years. HAB events are projected to increase overtime due to climate change and other environmental concerns, as well as population growth. Another serious risk to humans and animals is the ability of algae blooms to serve as vectors for other serious diseases, such as avian botulism, from which tens of thousands of fish and birds in the Great Lakes have perished since 1999,[3] or malaria,[4] to name a few.

The HSUS implores the Council to think about pet safety and wildlife conservation, and to recommend action by EPA to improve practices now in order to curtail future HAB poisonings. We would especially like to see efforts to increase public awareness, including signage at known HAB sites to warn pet owners of the dangers, collaborate with veterinary hospitals to report incidents of cyanobacterial poisoning, and institute routine water testing. Thank you for your consideration.

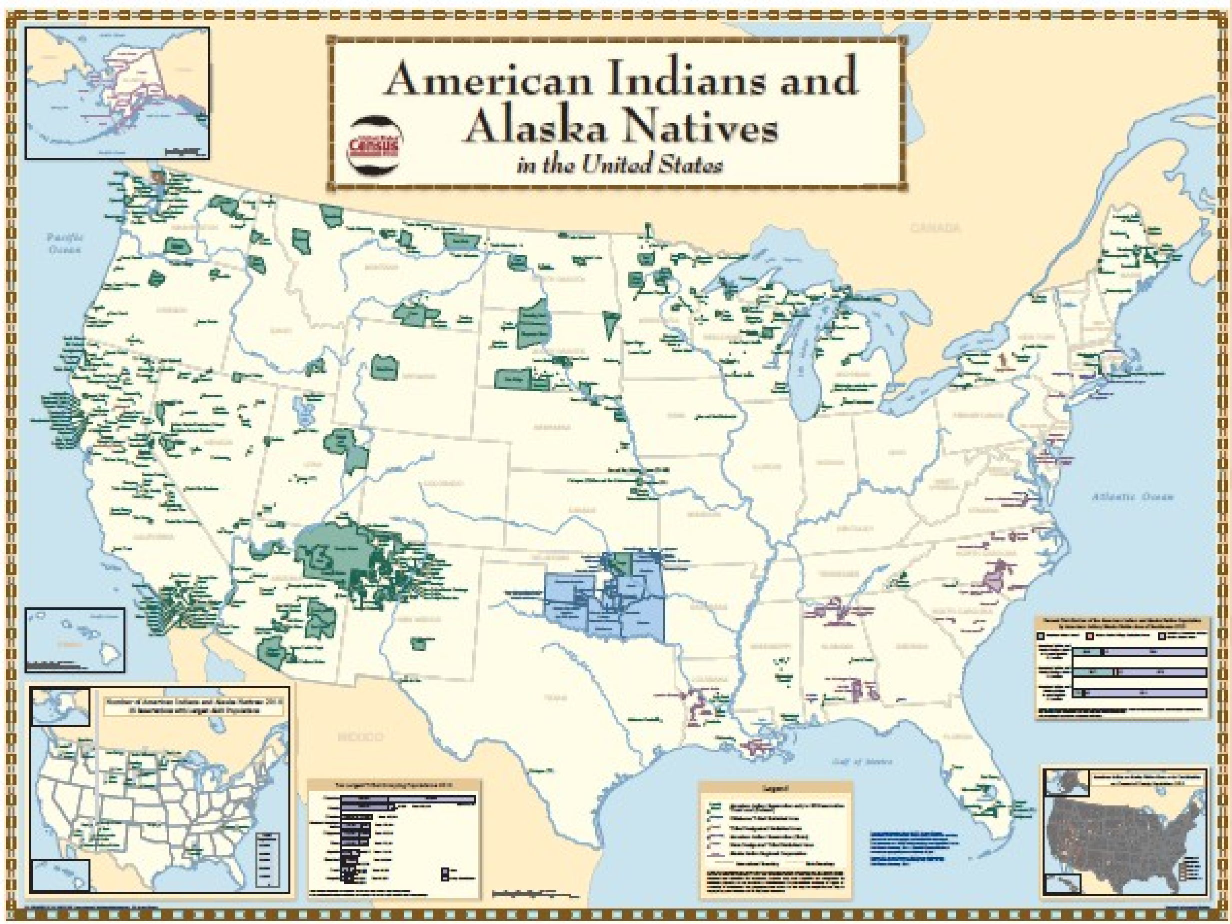
Sources:

1. Nutrient Pollition Impacts on the Nation. (n.d.). Retrieved from http://www2.epa.gov/sites/production/files/2013-08/infographic-nutrient-pollution-explained.png
2. Backer, L., Landsberg, J., Miller, M., Keel, K., & Taylor, T. (2013). Canine Cyanotoxin Poisonings in the United States (1920s–2012): Review of Suspected and Confirmed Cases from Three Data

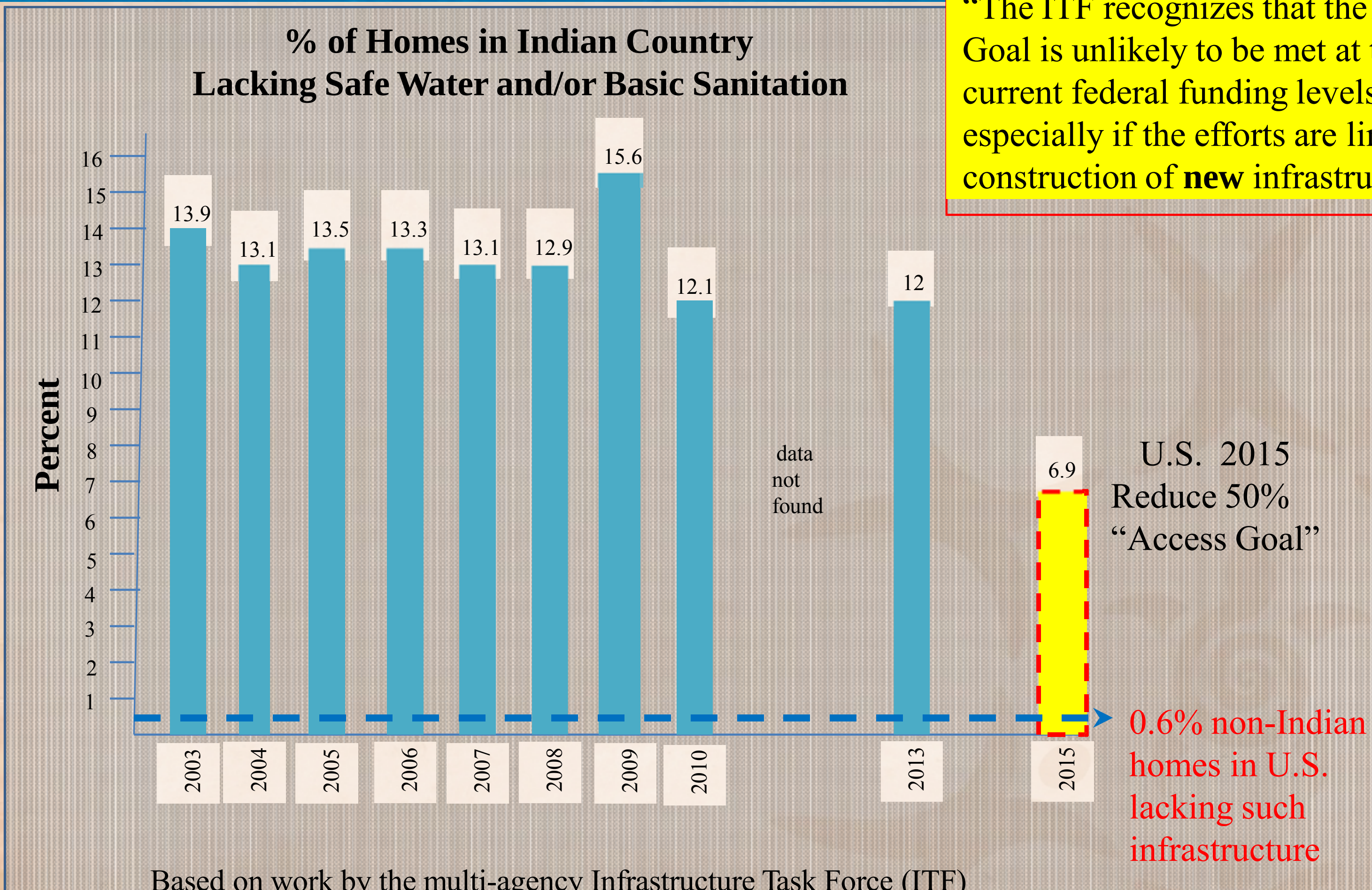
Sources. *Toxins, 5*(9), 1597–1628-1597–1628. Retrieved October 15, 2014, from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3798876/

3. USGS Great Lakes Restoration Initiative - Habitat & Wildlife - Avian botulism in distressed Great Lakes environments. (n.d.). Retrieved October 16, 2014, from http://cida.usgs.gov/glri/projects/habitat_and_wildlife/avian_botulism.html
4. Johnson, P., Townsend, A., Cleveland, C., Gilbert, P., Howarth, R., Mckenzie, V., ... Ward, M. (2010). Linking environmental nutrient enrichment and disease emergence in humans and wildlife. *Ecol Appl., 20*(1), 16-29. Retrieved October 15, 2014, from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2848386/

Indian Country



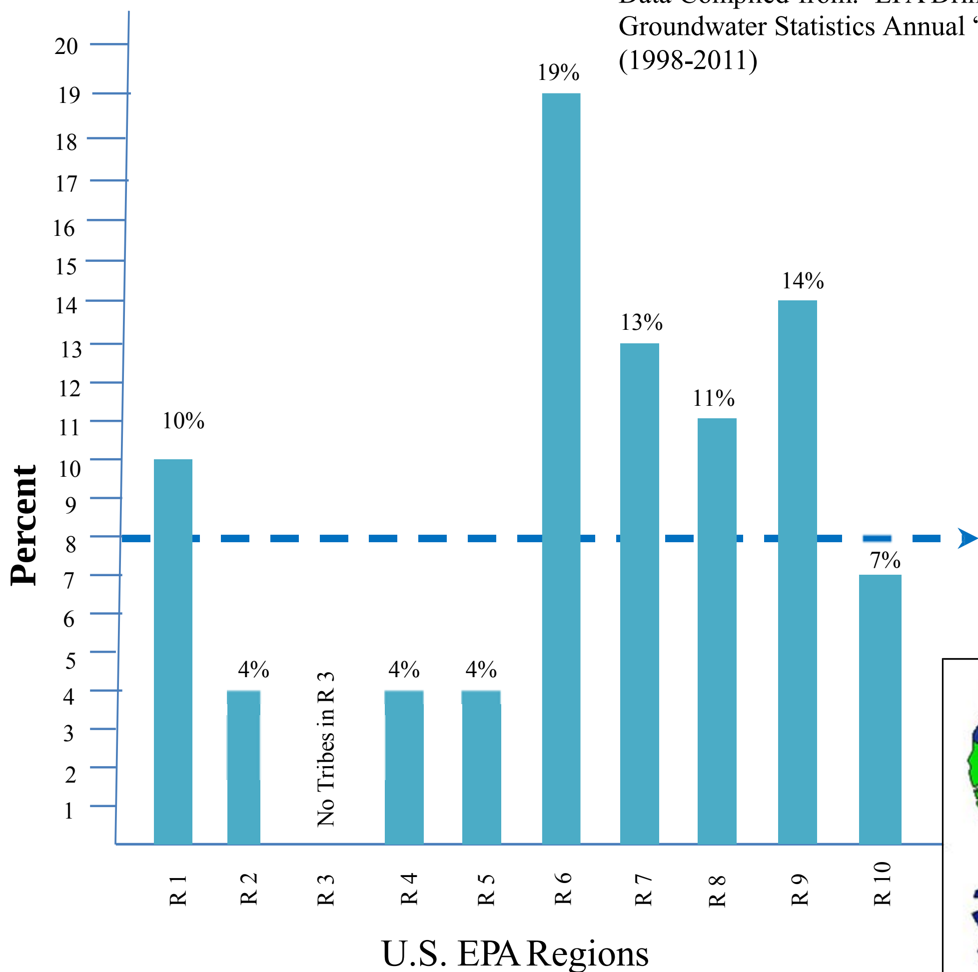
Access to Safe Water & Sanitation

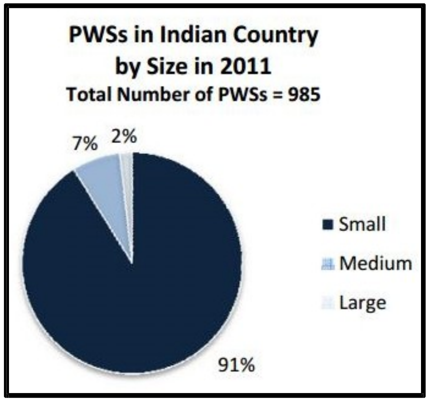


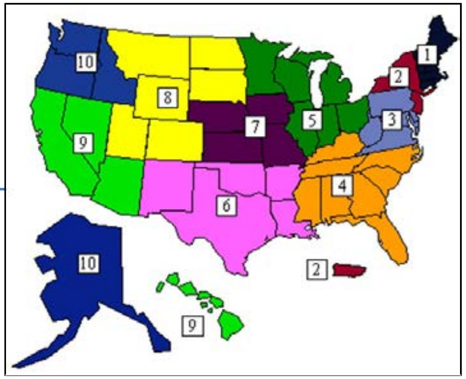
"The ITF recognizes that the Access Goal is unlikely to be met at the current federal funding levels, especially if the efforts are limited to construction of **new** infrastructure."

14-Year Running Annual Average of Tribal Community Water Systems with SDWA Health-based Violations

Data Compiled from: EPA Drinking Water & Groundwater Statistics Annual "Factoid" Reports (1998-2011)







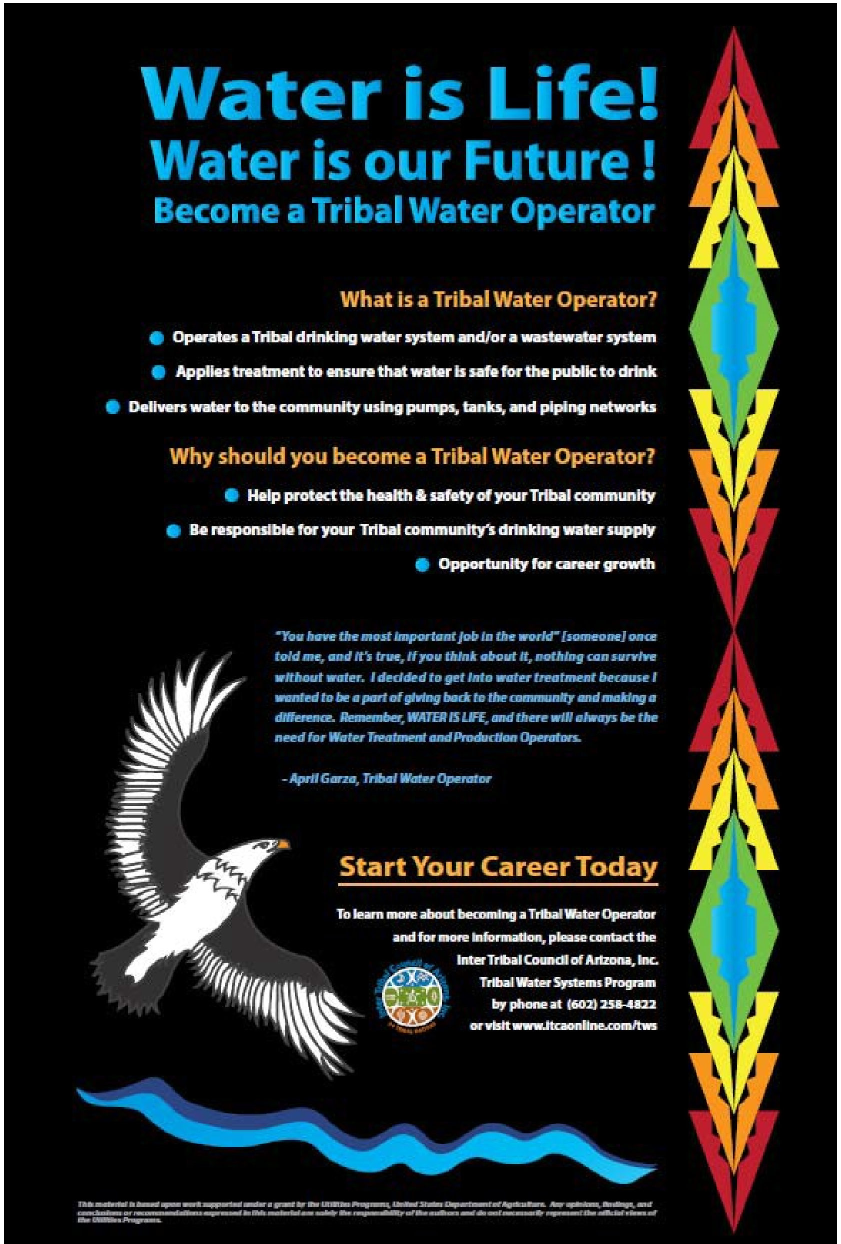
Technical, Managerial, and Financial Capacity

"Access to safe drinking water and basic sanitation in Indian Country can be short-lived if infrastructure is not maintained."

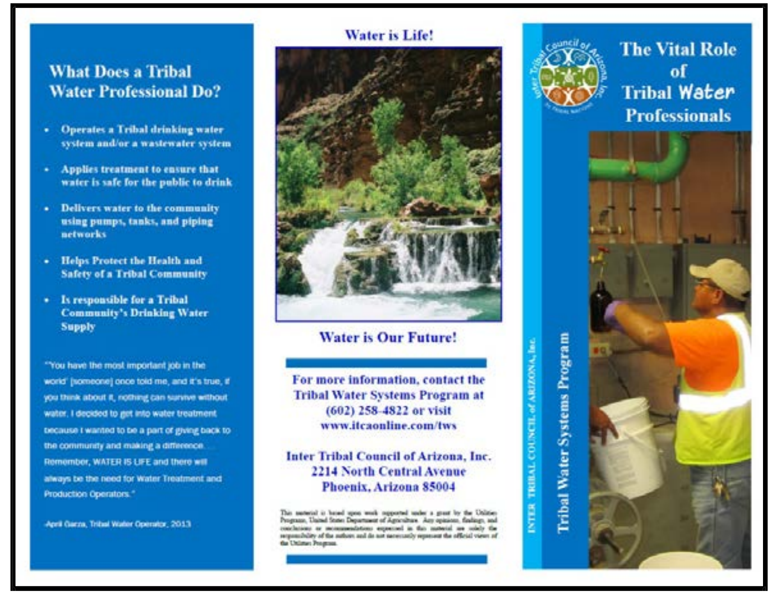
Factors interfering with infrastructure maintenance:

- Infrastructure design does not meet the Tribal needs and/or is not appropriate
- The management entity responsible for the water and waste disposal infrastructure assets is itself not sustainable and lacks appropriate authority, structure, and/or technical, managerial, or financial capacity

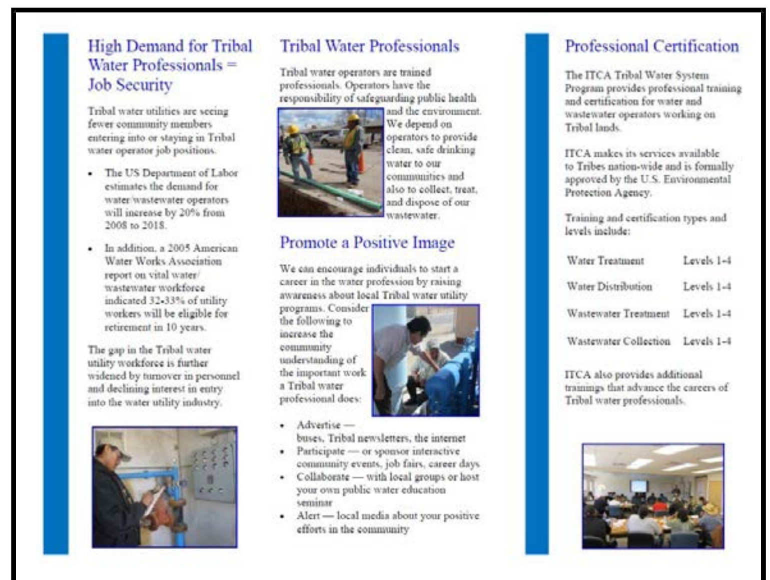
Source: Infrastructure Task Force, Sustainable Infrastructure Goal and Concept, 2011



Water is Life!
Water is our Future !
Become a Tribal Water Operator
What is a Tribal Water Operator?
Operates a Tribal drinking water system and/or a wastewater system
Applies treatment to ensure that water is safe for the public to drink
Delivers water to the community using pumps, tanks, and piping networks
Why should you become a Tribal Water Operator?
Help protect the health & safety of your Tribal community
Be responsible for your Tribal community's drinking water supply
Opportunity for career growth
"You have the most important job in the world" [someone] once told me, and it's true, if you think about it, nothing can survive without water. I decided to get into water treatment because I wanted to be a part of giving back to the community and making a difference. Remember, WATER IS LIFE, and there will always be the need for Water Treatment and Production Operators.
- April Garza, Tribal Water Operator
Start Your Career Today
To learn more about becoming a Tribal Water Operator
and for more information, please contact the
Inter Tribal Council of Arizona, Inc.
Tribal Water Systems Program
by phone at (602) 258-4822
or visit www.itcaonline.com/tws



What Does a Tribal Water Professional Do?
Operates a Tribal drinking water system and/or a wastewater system
Applies treatment to ensure that water is safe for the public to drink
Delivers water to the community using pumps, tanks, and piping networks
Helps Protect the Health and Safety of a Tribal Community
Is responsible for a Tribal Community's Drinking Water Supply
"You have the most important job in the world' [someone] once told me, and it's true, if you think about it, nothing can survive without water. I decided to get into water treatment because I wanted to be a part of giving back to the community and making a difference.... Remember, WATER IS LIFE and there will always be the need for Water Treatment and Production Operators."
-April Garza, Tribal Water Operator, 2013
Water is Life!
Water is Our Future!
For more information, contact the Tribal Water Systems Program at (602) 258-4822 or visit www.itcaonline.com/tws
Inter Tribal Council of Arizona, Inc.
2214 North Central Avenue
Phoenix, Arizona 85004
INTER TRIBAL COUNCIL of ARIZONA, Inc.
Tribal Water Systems Program
The Vital Role of Tribal Water Professionals



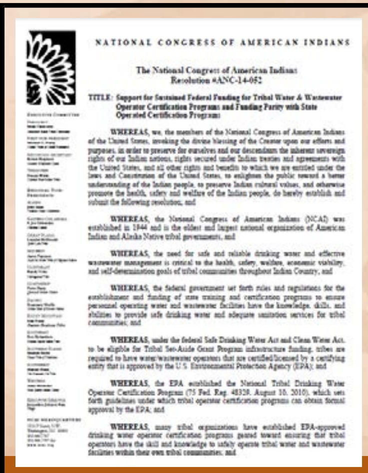
High Demand for Tribal Water Professionals = Job Security
Tribal water utilities are seeing fewer community members entering into or staying in Tribal water operator job positions.
The US Department of Labor estimates the demand for water/wastewater operators will increase by 20% from 2008 to 2018.
In addition, a 2005 American Water Works Association report on vital water/wastewater workforce indicated 32-33% of utility workers will be eligible for retirement in 10 years.
The gap in the Tribal water utility workforce is further widened by turnover in personnel and declining interest in entry into the water utility industry.
Tribal Water Professionals
Tribal water operators are trained professionals. Operators have the responsibility of safeguarding public health and the environment. We depend on operators to provide clean, safe drinking water to our communities and also to collect, treat, and dispose of our wastewater.
Promote a Positive Image
We can encourage individuals to start a career in the water profession by raising awareness about local Tribal water utility programs. Consider the following to increase the community understanding of the important work a Tribal water professional does:
Advertise — buses, Tribal newsletters, the internet
Participate — or sponsor interactive community events, job fairs, career days
Collaborate — with local groups or host your own public water education seminar
Alert — local media about your positive efforts in the community
Professional Certification
The ITCA Tribal Water System Program provides professional training and certification for water and wastewater operators working on Tribal lands.
ITCA makes its services available to Tribes nation-wide and is formally approved by the U.S. Environmental Protection Agency.
Training and certification types and levels include:
Water Treatment Levels 1-4
Water Distribution Levels 1-4
Wastewater Treatment Levels 1-4
Wastewater Collection Levels 1-4
ITCA also provides additional trainings that advance the careers of Tribal water professionals.

Jurisdictionally-Correct Operator Certification

State certification programs are not geared to meet the unique jurisdictional, legal, and cultural frameworks that apply to tribal water/wastewater systems in Indian Country.

Forcing tribal operators to use state certification programs adds yet another significant barrier to tribes being able to realize self-determination.

--NCAI Resolution No. ANC-14-052



NATIONAL CONGRESS OF AMERICAN INDIANS

The National Congress of American Indians
Resolution #ANC-14-052

TITLE: Support for Sustained Federal Funding for Tribal Water & Wastewater Operator Certification Programs and Funding Parity with State Operated Certification Programs

WHEREAS, we, the members of the National Congress of American Indians of the United States, invoking the divine blessing of the Creator upon our efforts and purposes, in order to preserve for ourselves and our descendants the inherent sovereign rights of our Indian nations, rights secured under Indian treaties and agreements with the United States, and all other rights and benefits to which we are entitled under the laws and Constitution of the United States, to enlighten the public toward a better understanding of the Indian people, to preserve Indian cultural values, and otherwise promote the health, safety and welfare of the Indian people, do hereby establish and submit the following resolution; and

WHEREAS, the National Congress of American Indians (NCAI) was established in 1944 and is the oldest and largest national organization of American Indian and Alaska Native tribal governments; and

WHEREAS, the need for safe and reliable drinking water and effective wastewater management is critical to the health, safety, welfare, economic viability, and self-determination goals of tribal communities throughout Indian Country; and

WHEREAS, the federal government set forth rules and regulations for the establishment and funding of state training and certification programs to ensure personnel operating water and wastewater facilities have the knowledge, skills, and abilities to provide safe drinking water and adequate sanitation services for tribal communities; and

WHEREAS, under the federal Safe Drinking Water Act and Clean Water Act, to be eligible for Tribal Set-Aside Grant Program infrastructure funding, tribes are required to have water/wastewater operators that are certified/licensed by a certifying entity that is approved by the U.S. Environmental Protection Agency (EPA); and

WHEREAS, the EPA established the National Tribal Drinking Water Operator Certification Program (75 Fed. Reg. 48329, August 10, 2010), which sets forth guidelines under which tribal operator certification programs can obtain formal approval by the EPA; and

WHEREAS, many tribal organizations have established EPA-approved drinking water operator certification programs geared toward ensuring that tribal operators have the skill and knowledge to safely operate tribal water and wastewater facilities within their own tribal communities; and

The State Revolving Fund

State Loan Fund Capitalization Grant Program
a.k.a. State Revolving Fund (DWSRF)

"In addition to financing infrastructure through loans, states have the flexibility to set aside and award funds for targeted activities that can help states implement and expand their drinking water programs…"

"Taken together, up to ***31%*** *of a state's DWSRF capitalization grant can be set aside for activities other than infrastructure construction. These set-asides enable states to improve water system operation and management, emphasizing institutional capacity as a means of achieving sustainable water system operations. However, the use of set-asides must be balanced with the need to fund infrastructure…"*

Includes funding of state operator certification programs

—Analysis of the Use of Drinking Water State Revolving Fund Set-Asides: Promoting System Sustainability, Federal Fiscal Year 2008 (EPA 816-R-10-016, October 2010), emphasis added

Limitation of the Tribal Set-Aside Program

"There are a number of 'non-infrastructure improvement' activities described in SDWA sections 1452(g)(2) and 1452(k) that the Act allows to be funded with State Revolving Loan fund appropriations. It is ***EPA's interpretation*** *that the SDWA does not provide the same allowance for the DWIG TSA funds…"*

"The definition section of the SDWA states that; 'for the purposes of section 1452, the term 'State' means each of the 50 States, the District of Columbia, and the Commonwealth of Puerto Rico.' Indian Tribes were not included in the term 'State' for purposes of section 1452, and section 1452 is where the Tribal Set-Aside program is authorized. As a result, ***we believe*** *that we do not have the statutory authority to use DWIG TSA funds for the purposes described in sections (g)(2) and (k)…."*

"Although the SDWA does not provide for the above activities under the DWIG TSA program, EPA recognizes their importance to Tribal water system operation—especially system capacity development (including operator training and certification), and the various source water protection activities…"

—Drinking Water Infrastructure Grants Tribal Set-Aside Program Final Guidelines (October 1998)

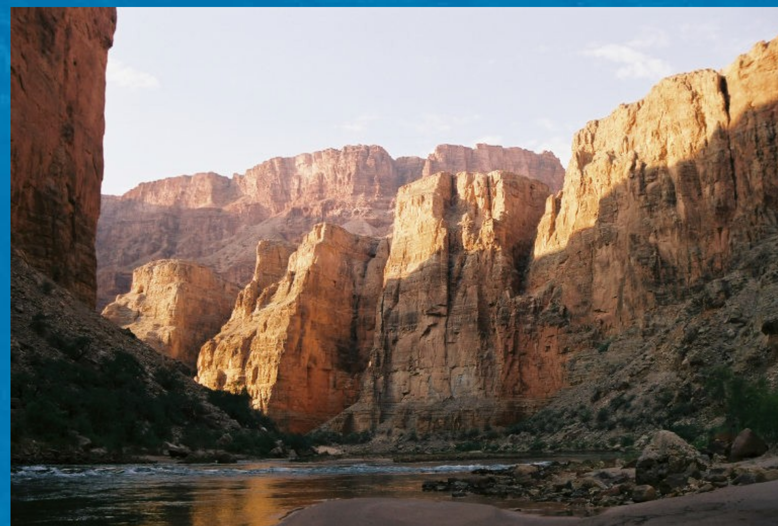
Workforce Capacity Building

The few federal funding opportunities that exist for tribal water-sector workforce capacity building initiatives are short-term in nature and are geared towards large nation-wide corporations.

As a result, very few tribally-led organizations have programs that provide water-sector capacity building services and the survival of those tribally-led programs are gravely threatened.

A dedicated and sustained funding mechanism, which is non-discretionary and multi-year in nature, is needed for tribally-led capacity building initiatives. Such funding must not diminish appropriations for infrastructure construction or other existing tribal programs.

Time for Questions?



2214 North Central Avenue | Phoenix, Arizona 85004

Brian Bennon, Tribal Water Systems Program Manager

p (602) 258-4822

Brian.bennon@itcaonline.com

Public Comment at National Drinking Water Advisory Council
Presentation by Inter Tribal Council of Arizona, Inc.
November 7, 2014

PRESENTATION NOTES

Honorable members of the Council
I am Brian Bennon, Hydrologist and Tribal Water Systems Program Manager at ITCA
I am here to convey the concerns documented in these three handouts

- Resolution #ANC-14-052 of National Congress of American Indians (NCAI)
- Letter from Region 9 Tribal Operations Committee (RTOC)
- Resolution of 21 Member Tribes of the Inter Tribal Council of Arizona (ITCA)

Slide 1

566 Federally Recognized Tribes—"Indian Country"
Where the median household income is 31% less than that of the nation ($35K/51K)
Indian Country has the highest poverty rate in the nation (29%)
There are 828 Public Water Systems in Indian Country, 91% classified as Small and Very Small
In EPA Region 9:
½ of Indian Country land mass is in states of AZ, CA, and NV
39% of Indian Country PWSs serve population of 463,000
Some tribes in AZ have unemployment rates of 50-70%

These are Not just the same issues as faced by rural communities
The Federal Government and Tribes have unique Gov-to-Gov relationship
—based on treaties and subsequent formation of reservations
Well-established water rights case law
Indian Reservations created with inherent Federal Trust Responsibility to ensure sufficient water to support livelihoods of its residents
We take position that this includes access to safe drinking water.

Slide 2

12% of homes in Indian Country lack access to safe water and basic sanitation
U.S. commitment made to the United Nations Millennium Goal will not likely be met

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Slide 3

Not just quantity, but a water quality issue as well
Compliance with SDWA continues to be a problem in Indian Country
Again, 91% of PWSs in Indian Country are classified as small or very small systems

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Slide 4

The Infrastructure Task Force (ITF) identified contributing factors: lack of Technical, Managerial, or Financial capacity, as well as utility governance

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Slide 5

Tribal Water Systems (TWS) Program—31 years old

Provides Technical Assistance, Training, Tribal Operator Certification (EPA approved)

National Tribal Drinking Water Operator Certification Program

TWS is "For Tribes & By Tribes", with direct Tribal Oversight (boards, working groups)

The TWS goal is to remove barriers that inhibit tribal members in becoming certified operators or inhibit sustainable operations and maintenance of tribal water utilities

TWS annually empowers 600 tribal personnel, and more than 3,000 tribal operator certifications earned since 1983

Annual budget of $800,000

Slide 6

The importance of jurisdictionally-correct operator certification

State certification programs do not meet needs of Indian Country

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Slide 7

States enjoy using portion of the State Revolving Fund (SRF) for non-construction of infrastructure: operator capacity building and program implementation (e.g., operator certification programs).

With that flexibility, states can use the SRF to strike a balance between infrastructure construction and long-term protection of the infrastructure investments

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Slide 8

The Tribal Set-Aside Program is supposed to be the tribal counterpart to the SRF

EPA interpretation of the SDWA: the Tribal Set-Aside is restricted only to infrastructure construction

No capacity building; cannot be used for training or Tribal Operator Certification Program

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Slide 9

Very few federal funding opportunities for tribally-led organizations to provide tribal workforce capacity building

Two recent EPA funding cycles for TAT, $14M each, Tribal organizations received only $100K

31 years of funding by US DHHS 5-year block grant program is ending; No request for appropriations—OMB says EPA has the funding

We ask for:

1) Funding parity for workforce capacity building, increase in Tribal Set-Aside with set-aside for non-construction uses (e.g., training and tribal operator certification)
2) EPA funding for technical assistance and training (TAT) to include tribal set-aside for Tribally-led organizations (for tribes, by tribes)
3) Do Not diminish funding of other tribal programs in order to implement numbers 1 and 2 above.

Slide 10

Contact information

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 8 2009

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

MEMORANDUM

SUBJECT: Drinking Water Enforcement Response Policy

FROM: Cynthia Giles
Assistant Administrator

TO: Regional Administrators

Attached is a new enforcement approach designed to help our nation's public water systems comply with the requirements of the Safe Drinking Water Act. This new approach replaces the existing contaminant by contaminant compliance strategy with one that focuses enforcement attention on the drinking water systems with the most serious or repeated violations. The new strategy will bring the systems with the most significant violations to the top of the list for enforcement action in states, territories and in federal Indian Country, so that we can return those systems to compliance as quickly as possible. As we work to protect the public's access to clean and safe drinking water, we need to be especially vigilant about noncompliance that has the potential to affect children, such as violations at schools and day care centers.

This policy was developed through the intensive cooperation of the Association of State Drinking Water Administrators, all EPA Regions, the Office of Water and Office of Enforcement and Compliance Assurance, and reflects our shared commitment to clean and safe drinking water. This new approach will be implemented starting in January of 2010, and will be evaluated during the coming year to see if improvements are necessary to best protect public health.

Thank you for the work your staff does, working closely with the states, to achieve the goals of the Safe Drinking Water Act. We expect that this new enforcement approach will help us do an even better job of increasing compliance with this important law.

If you have any questions, please contact me, or have your staff contact Mark Pollins at (202-564-4001 or Karin Koslow at (202)564-0171.

cc:
Peter Silva
Cynthia Dougherty
Adam Kushner

Lisa Lund
Regional Enforcement Directors
Regional Water Division Directors
Regional Counsel, Regions II - VII, IX, X
Regional Legal Enforcement Managers, Regions I, VIII

Billing Code 6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

[FRL-XXXX-X]

Meeting of the National Drinking Water Advisory Council

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of a Public Meeting.

SUMMARY: The U.S. Environmental Protection Agency (EPA) is announcing a meeting of the National Drinking Water Advisory Council (Council), as authorized under the Safe Drinking Water Act (SDWA). The meeting is scheduled for November 6 and 7, 2014. The Council typically considers various issues associated with drinking water protection and public water systems. During this meeting, the Council will focus discussions on the approaches to regulating groups of carcinogenic volatile organic chemicals, harmful algal blooms, climate and drinking water issues and other program topics. In addition, the Council will also discuss options for compliance schedules relative to the Long Term 2 Enhanced Surface Water Treatment Rule.

DATES: The meeting on November 6, 2014, will be held from 8:30 a.m. to 5:00 p.m., eastern time, and on November 7, 2014, from 8:30 a.m. to 2:00 p.m., eastern time.

ADDRESS: The public meeting will be held in Room 1117-A at the EPA William Jefferson Clinton East Building, 1201 Constitution Avenue, NW, Washington, DC, 20004. All attendees must go through a metal detector, sign in with the security desk and show government-issued photo identification to enter government buildings.

FOR FURTHER INFORMATION CONTACT: Members of the public who would like to register and receive pertinent information, present an oral statement or submit a written statement for the November 6 and 7 meeting should contact Roy Simon by October 17, 2014, by e-mail at *Simon.Roy@epa.gov*; by phone at 202-564-3868; or by regular mail at the United States Environmental Protection Agency, Office of Ground Water and Drinking Water, William Jefferson Clinton East, (Mail Code 4601-M), 1200 Pennsylvania Avenue, NW, Washington, DC, 20460. Further details about participating in the meeting can be found in the **SUPPLEMENTARY INFORMATION** section.

SUPPLEMENTARY INFORMATION:

Details about Participating in the Meeting: If you wish to attend the meeting, you should provide your e-mail address when you register. The EPA will provide updated information on the November 6 and 7 meeting to registered individuals and organizations by October 29, 2014. The Council will allocate one hour for the public's input (1:00 p.m. – 2:00 p.m., eastern time) at the meeting on November 7, 2014. Oral statements will be limited to five minutes at the meeting. It is preferred that only one person present a statement on behalf of a group or organization. To ensure adequate time for public involvement, individuals or organizations interested in presenting an oral statement should notify Roy Simon no later than October 17, 2014. Any person who wishes to file a written statement can do so before or after the Council meeting. Written statements intended for the meeting must be received by October 29, 2014, to be distributed to all members of the Council before any final discussion or vote is completed. Any statements received on or after the date specified will become part of the permanent file for the meeting and will be forwarded to the Council members for their information.

National Drinking Water Advisory Council: The Council was created by Congress on December 16, 1974, as part of the SDWA of 1974, Public Law 93-523, 42 U.S.C. 300j-5, and is operated in accordance with the provisions of the Federal Advisory Committee Act (FACA), 5 U.S.C. App.2. The Council was established under the SDWA to provide practical and independent advice, consultation and recommendations to the EPA Administrator on the activities, functions, policies and regulations required by the SDWA.

Special Accommodations: For information on access or services for individuals with disabilities, please contact Roy Simon at 202-564-3868 or by e-mail at *Simon.Roy@epa.gov*. To request an accommodation for a disability, please contact Roy Simon at least 10 days prior to the meeting to give the EPA as much time as possible to process your request.

Dated: SEP - 8 2014

Peter Grevatt, Director,
Office of Ground Water and Drinking Water.

FACT SHEET

NATIONAL DRINKING WATER ADVISORY COUNCIL

http://water.epa.gov/drink/ndwac/index.cfm

What is the National Drinking Water Advisory Council?

The National Drinking Water Advisory Council (NDWAC) is a Federal Advisory Committee that supports EPA in performing its duties and responsibilities related to the national drinking water program. The Council was created on December 16, 1974, through a provision in the Safe Drinking Water Act of 1974.

NDWAC provides advice, information, and recommendations on matters related to activities, functions, policies, and regulations required by the Safe Drinking Water Act.

What is the composition of membership?

NDWAC has 15 members who serve as Special Government Employees. Members are appointed by EPA's Administrator or he/she may delegate this responsibility to the Deputy Administrator. Five (5) members are appointed from each of the following areas: 1) appropriate State and local agencies concerned with public water supply and public health protection, 2) water-related or other organizations and interest groups having an active interest in public water supply/public health protection, and 3) the general public. Two (2) of the 15 members must represent small, rural public water systems.

Technical Advisors from Other Federal Advisory Committees/Federal Agencies

A member of the Science Advisory Board, a Federal Advisory Committee on science and research issues, serves as a liaison to the NDWAC and attends NDWAC meetings and conference calls. A liaison from the Centers for Disease Control and Prevention also serves as a liaison to the NDWAC and attends the meetings.

Schedule of Meetings

Customarily, the Council has one meeting each year. The Chair of NDWAC and/or the Designated Federal Officer can also schedule conference calls on which a majority of the members must participate. Consistent with the Federal Advisory Committee Act, the Council holds open meetings and provides opportunities for interested persons to make statements within a designated time period at the one meeting or to file statements/comments before or after such meetings.

Subgroups

EPA may form NDWAC subcommittees or working groups for any purpose consistent with the Charter. Such subcommittees or working groups work through NDWAC. Subcommittees or working groups have no authority to make decisions on behalf of the NDWAC nor can they report directly to the Agency.